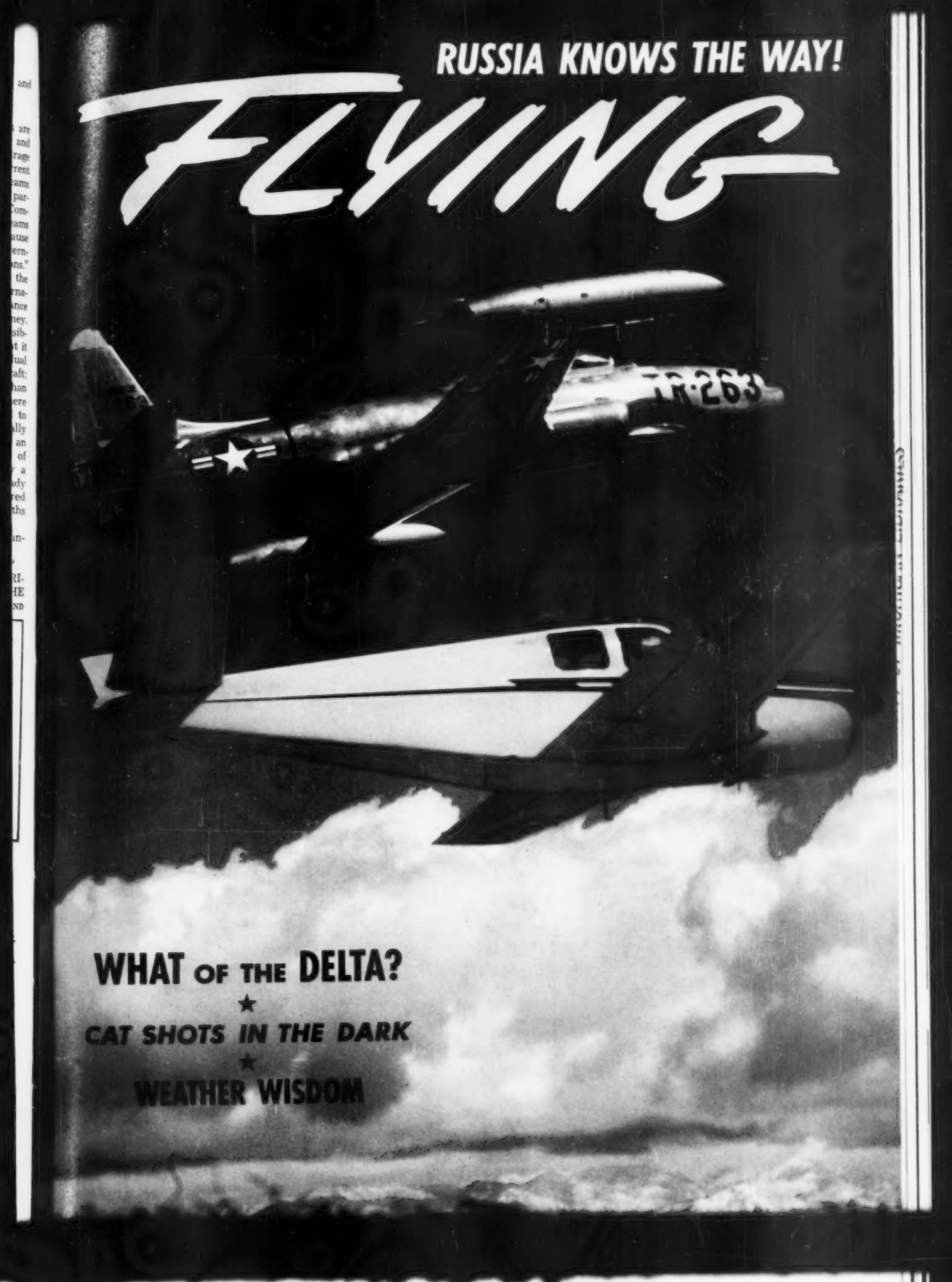
RUSSIA KNOWS THE WAY!

FLYING



WHAT OF THE DELTA?

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WEATHER WISDOM

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JAMES BELDON, HUNTINGTON, W. VA., owner of Belco Dental Laboratory, makes custom bridgework appliances for patients in a 3-state area. He says "direct consultation with dentists would be impossible without my Cessna 170. I haven't time to drive." Roanoke, Va. takes 9 hrs. by car. Beldon flies it in 1 hour, 45 minutes. He also uses his Cessna to attend clinics, conventions, visit metal suppliers, deliver finished jobs, participate in local Civitan activities. He praises Cessna's low maintenance cost and short-field performance, says "the Cessna is so stable it all but corrects my flying mistakes."

ROSS W. FOOTHORAP, BRIDGEPORT, CONN., manufacturer of specialized die sets, says "You can't sell engineering by mail!" In 1949, he bought a Cessna 170, found it so useful for making cross-country sales calls, delivering rush orders, giving customers special service that he recently added a fast Cessna 195! Foothorap says his Cessna 'fleet' has "more than doubled my business, broadened my territory and all but solved my metropolitan delivery problem . . . all for a ridiculously low flying price!" He says his 170 is the "safest ship I've ever flown, the easiest to maintain and costs less than an automobile to operate."

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FLYING's FAMILY

Alice S. Fuchs, who tosses equations around so competently (see "Floats Can Help You Navigate," p. 22), is a paragon of versatility. She qualifies as a college math instructor, English lit teacher, flight instructor, charter pilot, aviation columnist, ground school instructor, wife and mother.

Says Alice: "I started flying in 1939 while working for a master's degree at Penn State. There I met my future husband, now Maj. William R. Fuchs, an Air Force pilot currently teaching engineering at West Point.

"On our first wedding anniversary Bill presented me with a second-hand Cub, which he fitted out with flight instruments and in which he started me on the way to my instrument rating. The Cub was succeeded by a variety of planes—T-craft, Aeronca, and now a Luscombe floatplane which will soon give way to a four-place plane big enough to take along our two favorite passengers, four-year-old son Billy and eight-month-old daughter Nancy."

Alice S. Fuchs

In months past, Alice has challenged FLYING readers with ingenious adaptations of the Cheese Box and the Alarm Clock to make navigation easier. Her future experiments will doubtless depend on the characteristics of that four-placer, due to be acquired by the Fuchs family.

* * * *

Bob Blatt, author of the popular FLYING feature "Pilot Aids", is another regular contributor whose talents are many and varied. During 11 years as a pilot, he's covered most of the country in his own plane. A recognized authority on airport lighting (see "Let There Be Light", FLYING, June), he served as chief airport lighting engineer for the CAA in Washington from 1941-44 and is currently chairman of the Committee on Aviation Lighting of the Illuminating Engineering Society, of which he's been a member since 1941.

That accounts for the hobbies. For the past three years, Bob has been associate editor of the magazine, "Electrical World". Before that he held various editorial jobs with "American Aviation", "Airports Magazine" and "Aviation Maintenance".

Bob's apparently inexhaustible cache of tips to help private pilots in the efficient maintenance and handling of their aircraft has made him the valued ally of thousands of FLYING's readers.

THE COVER: No, it's not a paste-up. This is an actual photograph of a Lockheed T-33 jet trainer and a Beech *Bonanza* flying formation over California.

FLYING

Reg. U. S. Pat. Off.

JULY, 1952 VOLUME 51, NUMBER 1

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SUBSCRIPTION SERVICE: All communications concerning subscriptions should be addressed to Circulation Dept., 64 E. Lake St., Chicago 1, Ill. Subscribers should allow at least two weeks for change of address.

CONTRIBUTIONS: Contributors are advised to retain a copy of their manuscripts and illustrations. Contributions should be mailed to the New York Editorial Office and must be accompanied by return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Any copy accepted is subject to whatever adaptations and revisions are necessary to meet the requirements of this publication. Payment covers all author's, contributor's and contestant's rights, title, and interest in and to the material accepted and will be made at our current rates upon acceptance. All photos and drawings will be considered as part of the material purchased.

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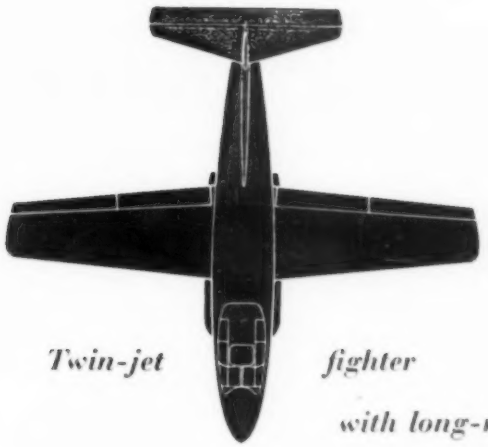


Twin-jet fighter with long-range radar eyes

—the Douglas Skyknight

Designed and built for Navy carriers, the Douglas F3D Skyknight provides our fleets with round-the-clock protection. Attack, patrol, reconnaissance, or escort, Skyknight can handle them all.

Aided by its radar eyes, the Skyknight can search out distant targets 24 hours a day. The pilot of this unique two-man, twin-jet, long-range fighter—guided by his radar operator—comes in on targets with split-hair accuracy . . . to hit with both rockets and bullets. And although Skyknight approaches sonic speeds, its hydraulic flaps can slow it down for combat maneuvers or carrier landings.

The carrier-based F3D Skyknight, now in volume production, is typical of Douglas leadership in aviation. Planes that can be mass-produced to *fly further and faster with a bigger payload* is the basic rule of Douglas design.

Depend on *DOUGLAS* **First in Aviation**

FLYING
VOLUME 51, NO. 1
JULY, 1952

AN EDITORIAL

THE WILL TO SURVIVE

Three basic factors are involved in American defense against Soviet attack—industrial power . . . military man power . . . and national will power.

The United States excels in the first; the Soviet Union in the second. The third well may be decisive. Which nation has the greater faith in its appointed destiny—and the greater will to endure?

The contrasting aviation scene offers evidence that Soviet will power is outstripping us. Russia is at a flood tide of youth training and public air enthusiasm.

In sharp contrast stands American apathy.

From some perspectives at least, the picture has ominous overtones.

The conquest of the air has been our nation's greatest single achievement. Yet today the country is swept by a wave of anti-aviation concepts. We hear powerful objections to the location of air facilities—facilities which one day may be the primary defense against enemy attack.

Young men seem no longer eager to participate in American air superiority. The last cadet class of the Air Force to enter training was short of its quota—unprecedented in history.

The average age of the U. S. airmen fighting in Korea is 32.6 years. In contrast the average age of the airmen who fought in World War II was 23 years! What a devastating commentary this silent fact is on the spiritual hardihood and readiness of our once irrepressible youth.

The remaining pool of Air Reservists is almost empty.

Commercial airlines in the United States, a vital element of defense, have been combing the country for qualified pilot material.

Admiral Robert B. Carney, Commanding Southern Europe NATO forces, recently told Congress that his theatre is desperately short of air power.

These bits of fact add to the unhappy conclusion that there no longer will be a harvest of skilled young airmen for national security. This in the United States, home of aviation know-how, flying skill, and the ablest group of young men in the world.

The question is becoming inescapable. Do we still have the will to survive and to lead a free world? The time is late. If we seek peace and security we should be preparing invincible air power. Such air power begins with a mighty foundation of trained youth, indoctrinated in the faith of the airman.

At the practical level there are required immediately national youth programs of aviation education, soaring, simulated flight and communications training, and light plane flying. The harvest cannot be reaped in its season unless the soil is prepared, the seed planted and the field cultivated.

The objective must be higher than that of putting an easy buck in the pocket of an operator, a school or an instructor. Survival of the nation is at stake! National health in aviation is the objective. Outside of the truly commercial enterprises, whatever programs are instituted must be intelligently linked to the nature and extent of the national crisis. Too little, too late will be pathetically useless.

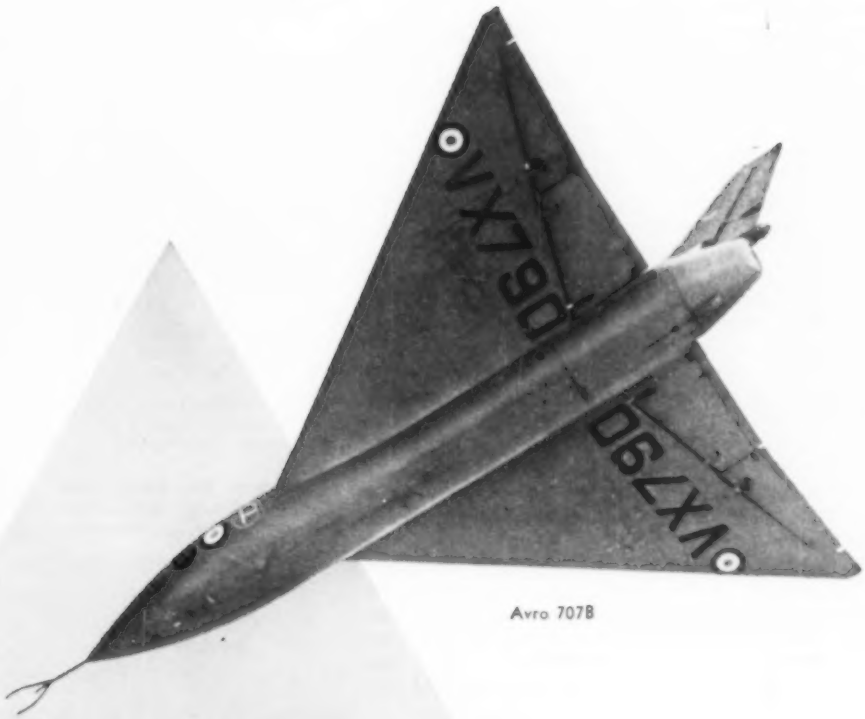
Our country has an unorganized wealth of superior aviation talent which could be marshalled for action if given inspiration, recognition and a platform. Organization of this talent into various projects of youth training would require fewer dollars and produce more potential air power than any similar dollars expended for security.

The government would do well to assemble for this purpose the Soaring Society of America, the National Intercollegiate Flying Clubs, the Civil Air Patrol, the National Flying Farmers, AOPA, and public school authorities, along with such professionals as the National Aviation Trades Association and the Aeronautical Training Society.

There is devotion and capacity in these groups. They can produce an economic and effective national program of air youth activity. If we have the will to survive, we will charge them with their obligation and supply them with the inspiration and material backing essential to their goal.

Gill Robb Wilson

Gill Robb Wilson
Editor and Publisher



Avro 707B

DELTA WING

By WILLIAM GREEN

Can we leap-frog the swept-wing to the delta design? Britain seems to say "Yes" as she focuses on the "Flying Triangle".

DESPITE the many arguments waging in aviation circles over the pros and cons of the delta planform, a stage has now been reached in which there can no longer be any doubt of the delta's ability to behave in the air as well as more orthodox airplanes. In point of fact, it performs far better than initial wind-tunnel evidence suggested, and the only valid argument remaining is in the engineering approach to making the best use of the planform.

Today, designers on *both* sides of the "iron curtain" are interested in the military potentialities of the delta. The airplane industries of the United States, Sweden and Russia are flight-testing deltas, while France and Canada have deltas under construction, but Britain currently possesses an edge on other powers in accumulated experience with the "flying triangle"; her airplane industry is testing

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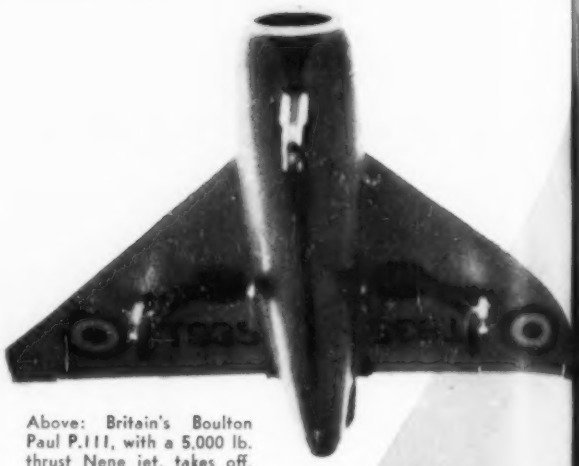
five different models, while deltas now taking shape in British plants may well place this futuristic planform in the forefront of modern combat airplane development.

Britain's extensive delta program was formulated shortly after the War as a bold attempt to jump the swept-wing era that was obviously dawning at that time. The results of German research indicated that the delta planform had possibilities for combat airplanes at both ends of the size scale, but, tempering enthusiasm with caution, a series of flying mock-ups and research airplanes of delta planform were put in hand before any serious design work on operational deltas was inaugurated.

Meanwhile, as a form of insurance against delays in delta development, work on more orthodox swept-wing combat airplanes proceeded. It was indeed fortunate that the British airplane industry did *not* put all its eggs in the delta basket, for the problems of the "flying triangle" proved difficult to solve. It was not until September '49 that flight testing of the first British delta began, and then a further setback in the program came when this airplane was totally destroyed barely a month after test flying had started.

Despite these initial reverses, many British airplane designers were willing to stake their reputations on the delta, and although British airplane manufacturers as a whole do not believe the delta to be necessarily the panacea for the airplane of the future, they are now firmly convinced that this planform is the next step in the design of high-speed combat aircraft, for the delta offers the designer a golden opportunity to get down to a really thin wing section in terms of thickness/chord ratio, and this is the "flying triangle's" most outstanding attraction.

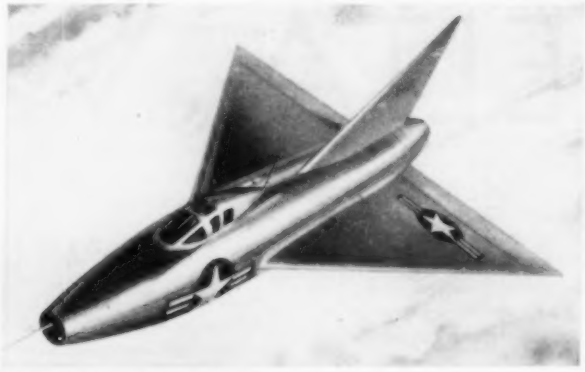
The delta is intuitively associated with the tailless type of airplane; as to whether the tail is really needed depends on the role of the aircraft and operational requirements. All tailless deltas are likely to suffer to some degree from lack of damping in pitch—there being no horizontal surface placed well aft of the CG—and this has a bearing on most flying maneuvers. It is generally considered that the



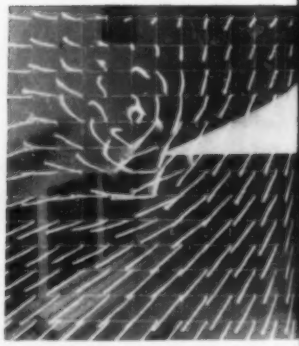
Above: Britain's Boulton Paul P.111, with a 5,000 lb. thrust Nene jet, takes off.

Below: The Fairey FD-1 probably presages a "target-defense" interceptor.

Right: The Convair F-92A was the first true delta-wing to be built by a United States manufacturer.



Below: The F7U-3 *Cutlass*, a product of Chance Vought Aircraft, is classed as a tailless modified delta.



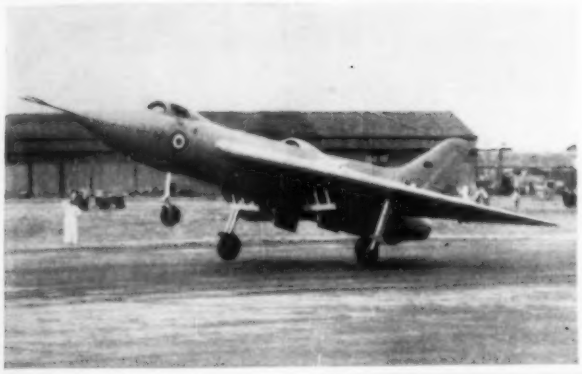
Wool tufts on a wire grid show the turbulence behind a delta wing sec-

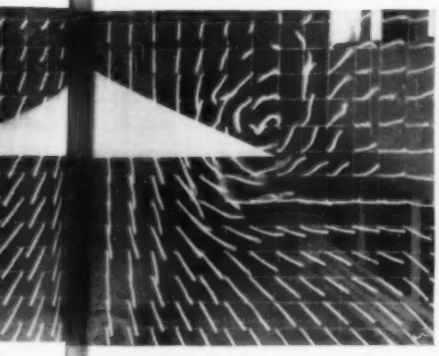
controls of a tailless delta would not be powerful enough to ensure recovery from a fully-developed spin. Although admittedly yet to be proved, this apparent drawback to the tailless delta from the fighter viewpoint appears to necessitate some form of tailplane, with all its weight and drag, but this problem does not, of course, trouble the bomber designer.

The low aspect ratio of the delta planform would appear to be a design contradiction where long ranges are a requirement, but at the altitudes to which air combat has now risen the delta planform comes into its own, and in-

Above: The Gloster G.A.5 is Britain's first operational delta aircraft for combat.

Below: An Avro 707B lands without brake chute. Angle of attack is high as result.





tion. This picture was taken in a wind tunnel at Langley Field, Va.

speeds and its effects on stability or control power.

At first sight, the delta planform may appear to be more applicable to the bomber than the fighter, and, according to reliable reports, the series of delta research airplanes built by the British Avro company are, in actual fact, flying scale models of a four-jet medium-heavy bomber destined to make its debut early next year. The Avro company is certainly playing a leading role among British airplane manufacturers in proving the case for the delta as a practical type. If reports of the forthcoming Avro delta bomber are to be relied upon, their research models are not, as has been suggested by the anti-delta school of thought, merely idealistic research vehicles, for they will thus possess the vital role of furnishing advance flight data for an airplane that will be era-marking in modern medium-heavy bomber design.

The Avro research deltas are designated Model 707. The first crashed when control was lost during a landing approach after a month of cautious test flying. This airplane was followed a year later by the slightly modified Model 707B which, like its predecessor, employed a well-tried turbojet (the 3,500 lb thrust Derwent) and the simplest method of feeding air to this unit, namely, by providing scoops above the unit itself. For time-saving in construction, the main landing gear members were "borrowed" from an Avro Athena trainer, and the nosewheel from a Hawker P.1052 fighter.

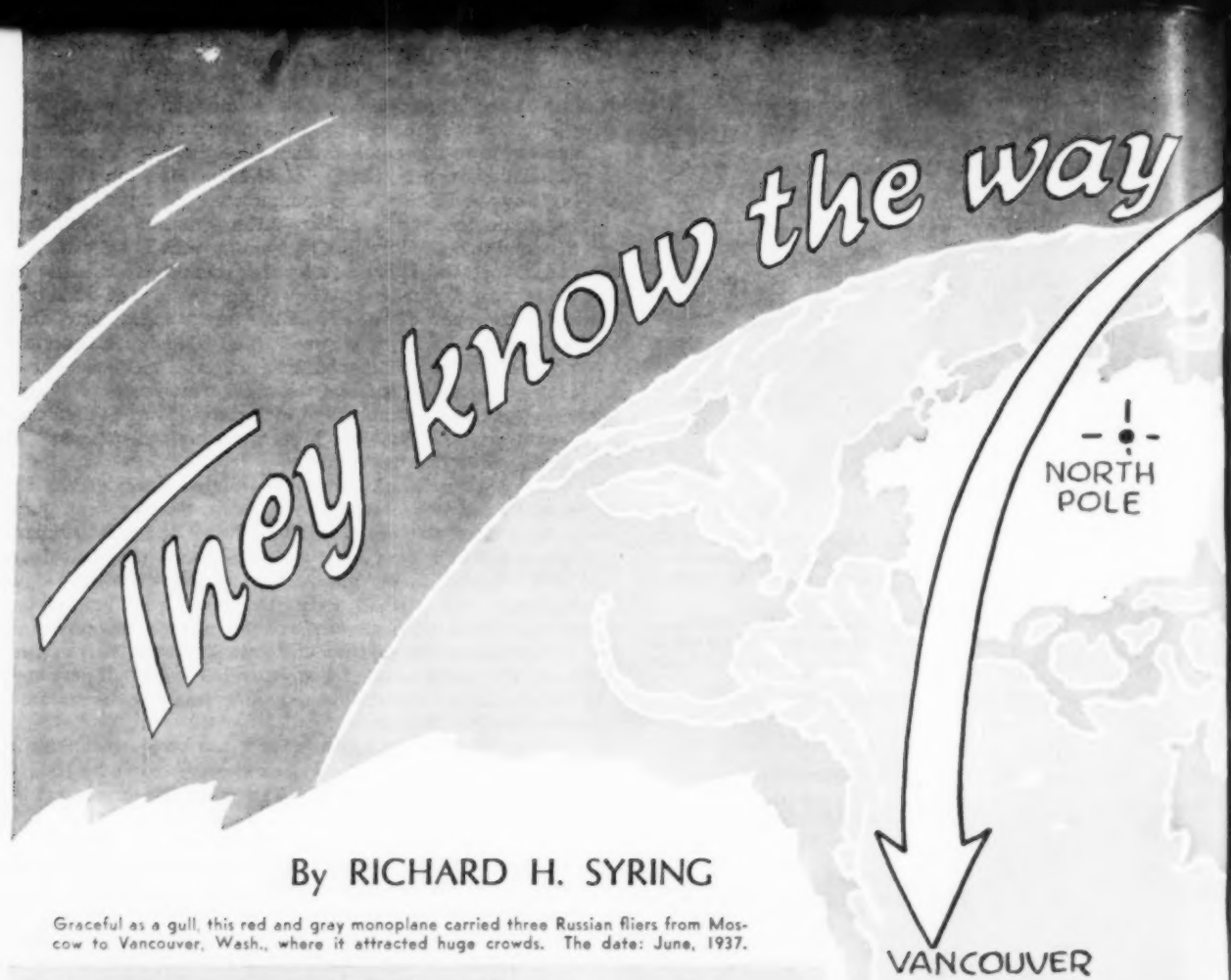
Even the control surfaces were conventional, operating with normal geared tabs and, unlike the "elevons" of U. S. deltas, comprised separate elevators and ailerons on the wing trailing edge. No flaps were fitted, but dive brakes —producing drag roughly equal to twice that of the whole airplane—were fitted at mid-chord, well inboard. These dive brakes necessitated considerable research in order that no trim changes would result from extension or retraction, and the question of overcoming changes of trim with power—eventually obviated by an angular cut at the end of the short tail pipe—called for much experimentation. For trim changes due to (*Continued on page* 44)

Left: Little has been revealed concerning Sweden's Saab-210. Its most distinct feature is its large fin.

Below: The Douglas XF4D-1 *Skyray* was designed for the U.S. Navy as a single-place delta-wing fighter.

duced drag losses may be more than compensated for by the possibility of building wings with a thickness/chord ratio of 10 per cent, down to as low as seven per cent. In fact, at high Mach numbers, some alleviation of compressibility effects is given by reducing aspect ratio. The delta planform leads to a very stiff structure without the use of thick wing skins, strength becoming the determining factor rather than structural stiffness, thus avoiding the inefficiency of conventional swept surfaces which have to be excessively strong in order to obtain necessary torsional stiffness, and diminishing aer-elastic distortion at high

They know the way



By RICHARD H. SYRING

Graceful as a gull, this red and gray monoplane carried three Russian fliers from Moscow to Vancouver, Wash., where it attracted huge crowds. The date: June, 1937.

IT WAS ABOUT 1 P.M. on Friday, June 18, 1937, when U. S. aviation enthusiasts, by now getting used to new and brave flying achievements, were rocked by startling news.

Alexander Troyanovsky, then Russian ambassador to this country, called in reporters to reveal that, the day before, three Soviet fliers had left Moscow on a non-stop flight over the North Pole, headed for San Francisco. They were making the 6,250-mile aerial trek in a water-cooled, single-engine, low-wing monoplane.

He added that the plane was then three hours from the North Pole and "going strong." It had left Moscow at 4:50 P.M. the afternoon before.

That was 15 years ago.

Would this Soviet monoplane, coming over Arctic wastes, set a new, long-distance record? Once before the Russians had flown a plane to the United States, but it was something about which they weren't bragging. On August 23, 1929, a plane called the "Land of Soviets" left Moscow for New York. Engine trouble and bad weather prevented this epic attempt from reaching Gotham until November 1.

Two Frenchmen, Paul Codos and Maurice Rossi, at this time held the world long-distance non-stop record. They had flown from New York to Syria, a distance of 5,675 miles. The American long-distance record holders then were Russell N. Boardman and John Polando, who had flown from New York to Istanbul, Turkey, July 28 to 30, 1931.

The three fliers making 1937's polar flight were now identified. Valerie Pavlovitch Chkalov, 33, a member of the Red Army since he was 15, who became a flier after

fliers had passed the North Pole by 800 miles at 4 A.M. They were south of the Pole, directly on the 123rd meridian and headed for Northern Canada. Shortly, the Royal Canadian signal corps at Edmonton, Alberta, got this radio message: "Everything O.K. Traveling 200 kilometers." At Seattle, the U. S. Army Signal corps had contacted the plane and was standing by.

Apparently the red and gray, ultra-streamlined craft could take the terrific headwinds and snow and ice. Its single engine throbbed tirelessly on. Designed in 1932 as a copy of a Dewointine monoplane, which flew in Siberia that year, the plane was finished in 1935. From the first it was intended for a flight across the pole.

The plane's goal was an airport across the bay from San Francisco, at Oakland. At 3:40 P.M. on Saturday, the Royal Canadian signal corps at Fort Smith radioed that the plane had passed over the province of Alberta with "everything well."

Airports from British Columbia on down the Pacific Coast were alerted. Newspaper reporters stayed on the job that Saturday night. Shortly after midnight, at 12:53 A.M., Sunday, June 20, the Soviet fliers reported they were nearing Bellingham, Wash., close to the British Columbian border. The weather was cloudy and heavy. It now was calculated they would reach the Oakland airport about noon on Sunday.

That Sunday turned out to be extra foggy and misty for so late in June. The ceiling was low and it was not a good day even for fliers familiar with the surroundings, much less a strange trio thousands of miles from home.

The Soviet's sturdy plane roared over Portland, Oregon, in the early hours. Somewhere over western Oregon,

George C. Marshall, then a brigadier general and field commandant, was host to the fliers at Pearson Field. Left to right are: Navigator Beliakov; Alexander Troyanovsky, then Russian ambassador to the U.S.; Gen. Marshall; Pilot Chkalov; Co-pilot Baidukov.

the Revolution, was pilot. Georgi Phillipovitch Baidukov, 30, who had left his home in Siberia at the age of 18 to become an expert flier in Leningrad, was co-pilot. Alexander Vassilievitch Beliakov, 40, who had served in World War I and now taught navigation in a military academy, was navigator.

All three held decorations as "Hero of the Soviet Union." Pilot Chkalov probably was Russia's top flier. Only the year before he was heralded in the land of the Communists for a non-stop flight of almost 5,800 miles. It was said to be a preliminary to the present flight. And this current hop over the top of the world, the Russians said, was a preliminary to inaugurating regular flights to the Pacific Coast. It was also to establish a North Pole base for weather and geographical observations.

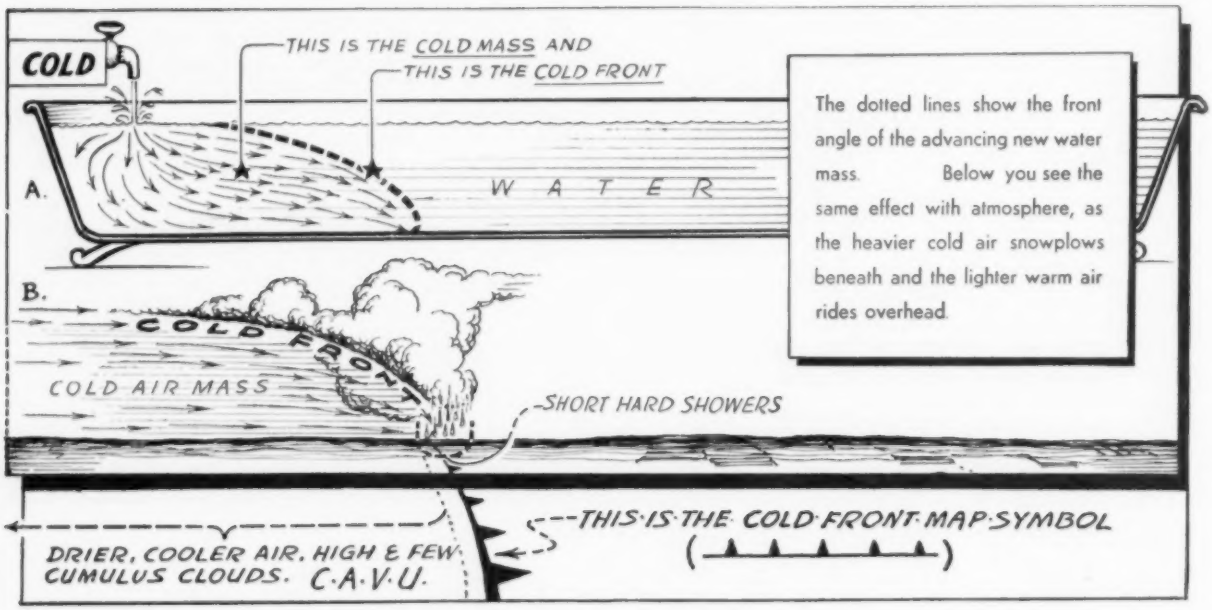
Early Saturday, June 19, on this day 15 years ago, the about 8 A.M., the fliers discovered a pump not working exactly right. They wheeled the monoplane and headed north again in search of an airfield.

A few minutes later, Eugene R. Spencer, a civilian mechanic at Pearson Field, Vancouver, Wash., army barracks, spotted a red and gray monoplane coming in downwind. Pilot Chkalov was preparing to land under power ready to take off again if the field proved too rough.

By 8:22 A.M., the plane taxied to a stop—63 hours and 17 minutes after it had left Moscow. Out of the plane piled three sleepy-eyed, tousle-haired fliers. Obviously, they were unhappy about not reaching Oakland. For a few moments they stood glumly by their plane, strangers on their first visit to the U. S. and unable to speak English.

George Kozmetsky, American-born son of Russian parents, approached the small circle. (*Continued on page* 48)

WEATHER WISDOM


COLD
THIS IS THE COLD MASS AND
THIS IS THE COLD FRONT
A.
WATER
B.
COLD FRONT
COLD AIR MASS
SHORT HARD SHOWERS
DRIER, COOLER AIR. HIGH & FEW CUMULUS CLOUDS. C.A.V.U.
THIS IS THE COLD FRONT MAP SYMBOL
The dotted lines show the front angle of the advancing new water mass. Below you see the same effect with atmosphere, as the heavier cold air snowplows beneath and the lighter warm air rides overhead.

Frontal Storms Expected

By ERIC SLOANE

This is the first of a "Weather Wisdom" series suggested by the manuscript of Eric Sloane's Weather Book, to be published shortly by Duell, Sloan and Pearce—Little, Brown.

TO THE RIGHT you see an awful mess—a cold front thunder storm—a critter now without terrors because we know how to protect ourselves against him, and can admit his existence.

Knowledge of weather phenomenon has delivered us not alone from hazards but from the worry which once tied our stomachs in knots. We are simply more weather wise.

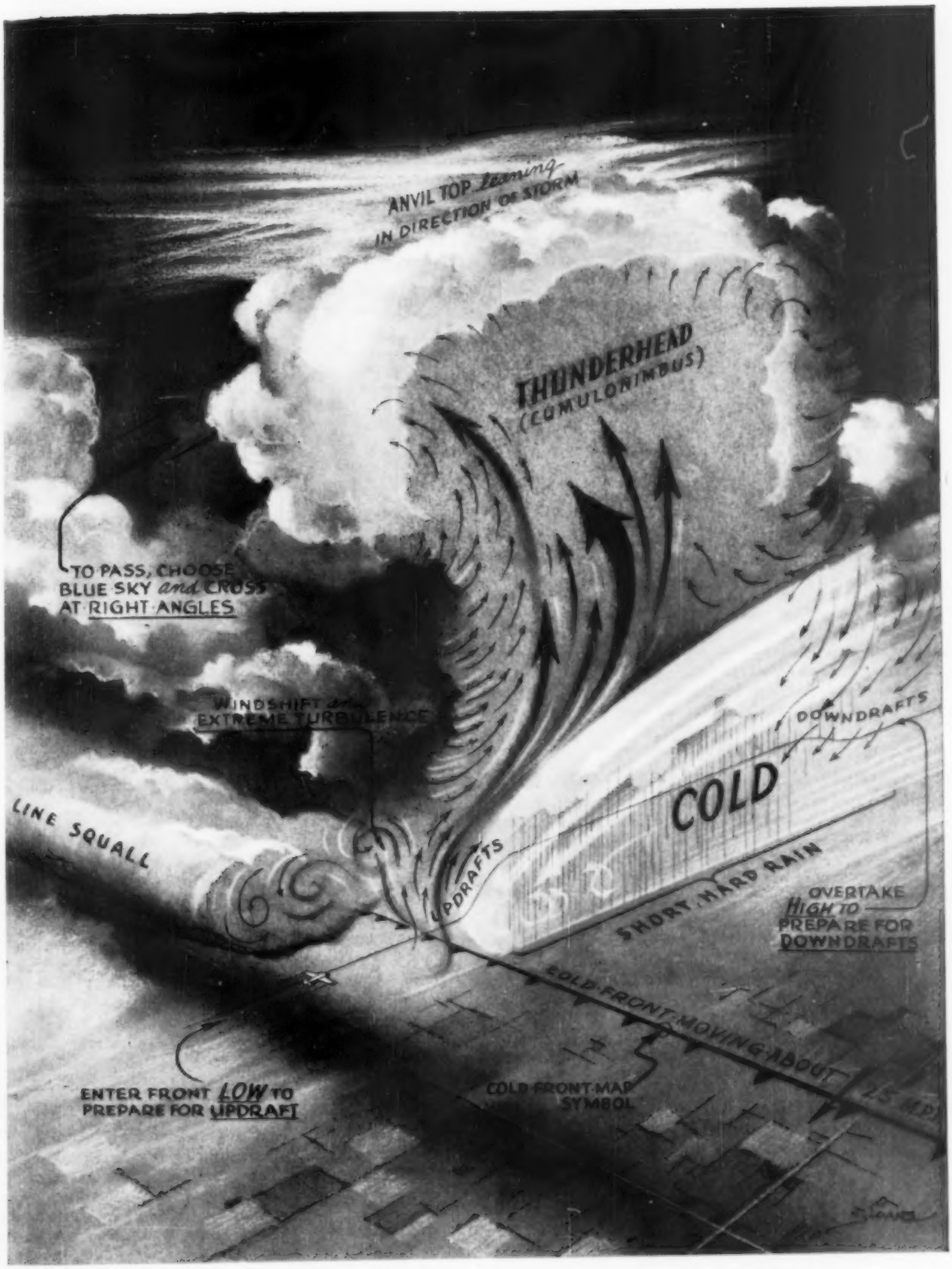
Anyway, this is just the first of a series of weather articles and I'll promise not to paint you such fearsome monsters from now on.

Yet truly there is something beautiful as well as frightening about a cold front squall. No words can describe the scene sometimes unfolding to the airman as he ranges close to a thunderhead. With the flickering of lightning from within, so frequent that it gives the illusion of a constantly burning fire, and the feeling of a thousand imps inside shoveling hail and snow out the top of the cloud, you have an unforgettable picture. From the land the cloud appears motionless but at close hand the action is a vicious boiling.

The drawing shows a fast-moving front during warm weather and the mass of cold air is acting like a woodplane with a downward slanted blade; it curls the warm air upward like shavings and tosses it into the towering cumulus.

Probably you are familiar with the anatomy of "fronts" but, in case your answer is negative, I have made the diagram above. It compares air with water, as meteorology so often does, and it shows the downward slant of an advancing heavier mass.

Cold air is heavier for several reasons. Maybe you are telling yourself that warm air is lighter because it expands; but air itself really doesn't expand. When it is heated the air particles jump around more and need more space so the volume is said to be greater. I'll bet you didn't know that moist air is lighter than dry air. I thought for a long time that if you added water to atmosphere it would get soggier and heavier; but before you can actually add water to atmosphere you must change it to vapor or gas. And this is (*Continued on page* 63)


ANVIL TOP leaning IN DIRECTION OF STORM
THUNDERHEAD (CUMULONIMBUS)
TO PASS, CHOOSE BLUE SKY and CROSS AT RIGHT ANGLES
WINDSHIFT & EXTREME TURBULENCE
DOWNDRAFTS
COLD
LINE SQUALL
UPDRAFTS
SHORT, HARD RAIN
OVERTAKE HIGH TO PREPARE FOR DOWNDRAFTS
COLD FRONT MOVING ABOUT 25 MPH
ENTER FRONT LOW TO PREPARE FOR UPDRAFT
COLD FRONT MAP SYMBOL

The Anatomy of a Fast Moving Cold Front

The Airplane's Day in Court

Hear Ye! Hear Ye! The slipstream of the air age injects new life into the old common law.

By KEN LESTER

"WAIT! Don't pull that trigger while we're flying over Montauk Point. That's murder. This is New York. You'll get the chair. Wait until we hit our next checkpoint, Newport. Then shoot. It's still murder, but you'll only get life in Rhode Island."

While you pause, Smith and Wesson in hand, pondering the verities of *lex loci delictus*, consider the impact aircraft have made on the legal mind at work.

Until recently, the law wasn't quite sure just what an airplane was. A motor vehicle? Not under the National Motor Vehicle Theft Act of 1919, as evaded by certain happy interstate airplane thieves, until amended in the spring of 1945. A vessel? Yes, in Reinhardt v. Newport Flying Service in 1921. No, in Cushing v. Smith a year later. It took the Air Commerce Act of 1926 to provide that "vessel" no longer applied to seaplanes, on the premise that if people meant aircraft they'd say aircraft. All in all, that was something of a coming of age.

Though a special beast in the eyes of the law, the airplane generally fostered little aeronautical law. Consequently, whenever a case arose involving aircraft, the courts resorted to common law. What was truth for Jones' oxcart became, by extension, truth and justice for Smith's biplane.

Applications of common law to wingèd situations were not so makeshift as might at first seem. Reason is the life of the law, whether it be common law, equity or statutory law. Therefore reason, the two-stay stretch of the mind, makes much air law simply new wine in old bottles.

Some of the new wine dribbled out of the old bottles, however. Airplanes are such noisy things, taking up so much space before they're airborne, then going so high, so far, so fast; completely ignoring state lines and property boundaries; occasionally so in distress as to fetch up all in a heap, to the detriment of real and personal property. Old bottles, indeed! Something had to be done.

Something was. In 1922 were devised the Uniform Air Acts for adoption by assenting states. In 1926, Congress passed the first Air Commerce Act. Many states adopted Federal regulations and supplemented them with their own statutes. In 1938, the Civil Aeronautics Act stated its purpose to include the regulation of air commerce in such manner as to best promote its development and safety.

Folks rarely take kindly to restrictive legislation and these Acts were no exception. In 1942 a chap named Rosenham said in effect: "I don't need an airworthiness certificate to operate on airways within the State of Utah. I have a state certificate." The court cleared its throat and

said: "Yes, you do need an airworthiness certificate. The Federal Act, devoted to promotion of safety and efficiency in interstate commerce . . . is supreme, although it may include within its scope activities which are *intra*-state in character."

A Nevadan named Drumm, for whose independence I have an illicitly high regard, had just landed at Bishop (Calif.) airport in 1942 when, in the words of the Assistant Aeronautical Inspector: "I asked him if he had a clearance and he said he did not; that he came from his own private field in Nevada and that he didn't need any." Later, "Mr. Drumm stated to the Chief of Police that the Civil Air Regulations did not apply to him; that he had his own airport, his own airplane, did not fly on civil airways or over restricted areas, so, therefore, we had no jurisdiction over him." Furthermore, according to counsel, the CAA didn't like the way he said it.

The appellate court, bless its heart, said Drumm had every right in the world to say what he pleased, especially as, being a citizen of good standing, he felt "his Constitutional rights were invaded." Then came the wry admission: "But, Drumm, old man, they're right about the license, you know." Judgment affirmed for the Government, leaving Drumm beaten but unbowed, with a lien on his Luscombe.

NO TRESPASSING

Throughout its evolution, the law has paid quite some heed to the man of property. In an effort to protect the

landowner, early cases adopted the principle that "he who owns the soil owns everything above and below, from the heavens to the center of the earth."

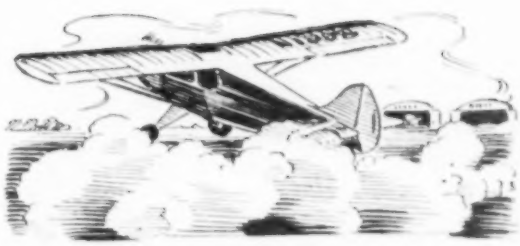
Then came the airplane, bringing to a head the problem of legal ownership of the airspace above a man's property.

Specifically, is Eastern's Flight Six trespassing on my half acre in Jersey when it rests fleetingly on the column of air borne by the already heavily mortgage-laden earth beneath? Common law has me owning everything "from the heavens to the center of the earth," and I had supposed this meant even up to the Pleiades.

The court disenchants us on two counts. Eastern is not trespassing, for the same reason that the Pleiades are not mine. "We recognize your right to the full enjoyment of your land, and will protect you in the utilization of that right, but only so far as you are able to, and actually do, use and occupy the airspace in question."

By extension of this reasoning it is now well settled that traversing the airspace above the property of another is not in itself a trespass but is a lawful act unless done in such a manner as to injure the possession of the landowner. Keep 'em flying!

So much for flying over. What if you touch down, with or without a thump? The court says that's easy. You're held liable for the direct damages that flow, as a necessary and natural consequence of your act.



The classic case of damage flowing from a trespass is that of Guille v. Swan in New York back in 1822 where the defendant, a balloonist, in descending became entangled in the ropes and called for help. A crowd of 200 came to his aid, making succotash out of the plaintiff's garden. The court found that although it was lawful for the balloonist to ascend and descend, he was nevertheless liable in trespass for the damage by himself and those attracted to the scene by his cries.

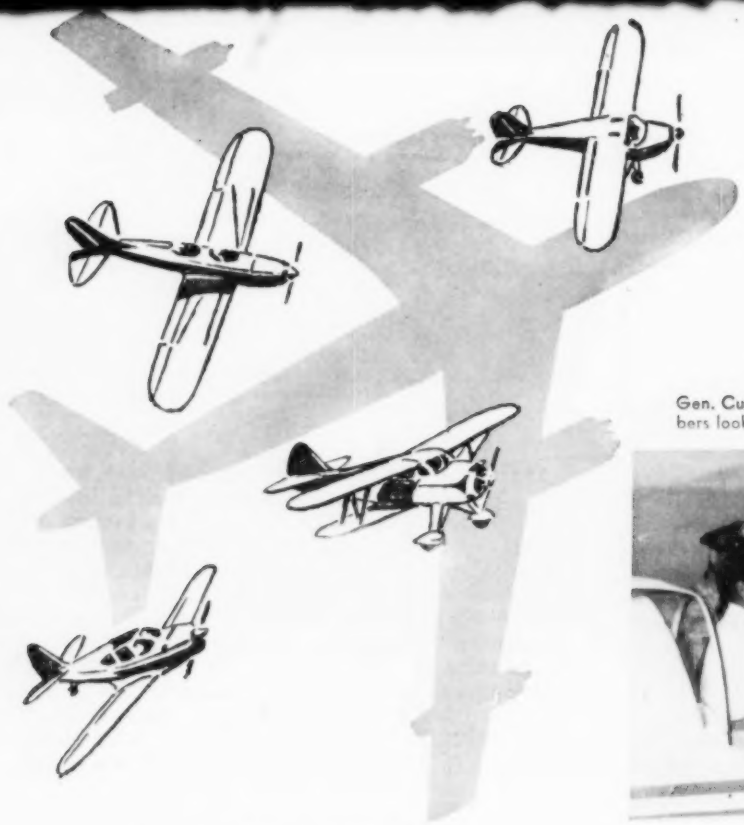
A century later the case of Rochester Gas & Electric v. Dunlop found this same rule applicable to airplanes. One night Dunlop was flying at 2,000 feet when his engine stopped. He attempted to land, crashed into a 50-foot electric transmission line tower and damaged it. Holding Dunlop liable for trespass and damage, the court said: "When damage occurs in such a case, one or the other party has to stand it, and no reason readily suggests itself why it should not be the one who has brought about the chance occurrence. Therefore such chance as there may be that a properly equipped and well handled aeroplane may still crash upon and injure private property shall be borne by him who takes the machine aloft." Caveat aviator, men.

HOW TO MAKE A NUISANCE

Just from the sound, I had always thought a "tort" might be a piquant South African fruit not unlike a kumquat. Imagine my chagrin to learn that, being the French word for "wrong," it is lawyer language for that class of ills including trespass, nuisance and negligence.

Nuisance is the unreasonable use that works hurt to another in the ordinary enjoyment of his property. Not the act, but the condition arising from the act. Nuisances in themselves are such things as the storage of high explosives and garbage disposal. Some things, not nuisances in themselves, may become nuisances by reason of the way in which an act is accomplished.

Airports are such. The ordinary and necessary operations usual in carrying on the (*Continued on page* 46)



They Fly for Fun

Gen. Curtis E. LeMay (right) and other Sac Aero Club members look over a Mooney *Mite*, new addition to the club fleet.

By DAVE KARTEN

NEBRASKA and Iowa skies are a happy playground for 65 members of the SAC Aero Club, a unique organization of Strategic Air Command Officers and enlisted airmen and women who take a busman's holiday and fly during their off-duty hours.

Founded in November, 1950, the club aims to encourage interest in aviation, to advance aeronautical knowledge and bring to more Offutt Air Force Base personnel the fun of flying.

It all started when 10 SAC pilots got together at the Omaha base and decided that enlisted men who had been commissioned pilots during World War II ought to have a chance to fly in their spare time.

Sac Aero Club members get pointers in engine overhaul from Maj. Ernest H. Moser (right), club president. The Aeronca C-3 in the rear is being completely rebuilt by the club.

"We each chipped in 10 dollars," explains Major Ernest H. Moser, the club president. "We paid $50 for an old C-3 which had been damaged in a hailstorm. The other $50 we put into the club fund. The plane's airframe and engine were okay but it needed re-covering. We spent the winter evenings repairing it, then we were in business."

As the membership grew, the club fleet expanded. It now includes light planes ranging from $600 jobs to sleek models costing $8,000—a Waco, Taylorcraft, a 125-hp Swift, a low-wing Howard, a PT-22 low-wing Ryan, a PT-26 low-wing Fairchild, a Cessna 140, a Mooney *Mite*, two Aeronca *Champions* and several others. The clubbers all take turns flying the assorted craft, and every member will tell you there's no finer sport.

The SAC Aero Club has already proved one thing—that there are no more democratic persons in the world than fliers. The club recognizes no rank and members are united in an appreciation of good sportsmanship and good flying. Members of the organization include all ranks, from private to general. The club roster also includes five WAFs, two of whom learned to fly in the club and recently completed their first solos.

One of the club's most enthusiastic members is General Curtis E. LeMay, former SAC Commander. He arranged for permission to use the hangar facilities at Offutt AFB—the club flies its planes out of South Omaha Airport—and the base hobby shop, where members learn aircraft design and construction, fabrication and welding, engine overhaul, rigging and maintenance, all under the strict supervision of licensed Air Force instructors.

At meetings held on the first Tuesday of each month, members hear talks by qualified personnel on weather, flight planning, flying technique and flying safety. The club has achieved an outstanding safety record.

President Moser points out: (*Continued on page* 50)

A weird streamer effect is achieved (center) as the air flow of coaxial rotors is studied by the dust-flow method at Langley Aeronautical Laboratory; photo at upper left shows Jim Whitten and Jack Reeder, NACA research pilots who are making test flights in the twin-rotor helicopter; at upper right, Reeder points out the "horse collar" placed around the 'copter greenhouse to improve stability.

TANDEM HELICOPTER

AMONG the hundreds of research projects now being conducted by the National Advisory Committee for Aeronautics at its Langley Field base in Virginia is one that is watched closely by the helicopter industry and the military services.

Its aim is to formulate standards for handling qualities appropriate to tandem rotor machines, to obtain scientific data useful to the designers of the "flying banana," and to further aid the designers of any tandem rotor helicopter.

As the helicopter increases in size and range, it will inevitably be found that one arrangement for securing mass lift will offer greater potential than others. The arrangement of tandem rotors is one of the possibilities—hence the research at Langley Field to accumulate experience pertaining to this particular avenue of progress.

With a tandem rotor Piasecki machine loaned by the Bureau of Aeronautics, flight tests are under the supervision of Melvon N. Gough and Frederick B. Gustafson, respectively NACA's Chief of Flight Research, and top specialist in rotary wing research. The machine in use is not singled out for study, but serves merely as an example of a tandem rotor type for test purposes.

With research pilots John P. Reeder and James B. Whitten at the controls, the first series of tests have investigated the longitudinal characteristics of the plane . . . its nose-up and nose-down behavior. The experts want to be sure that the tandem type 'copter does not have a tendency to diverge rapidly in pitch when disturbed in steady flight.

The tests consisted of flying the Piasecki in various flight conditions and comparing the pilot's impressions of the longitudinal flying qualities of the machine with instrument recordings of a special test maneuver which the Navy has set as a requirement. The Navy test maneuver is a sudden pull-up from steady flight. The results have indicated that the longitudinal stability requirements of the Navy are generally applicable to tandem helicopters.

These requirements were based primarily on earlier NACA work with single-rotor types, such as Sikorsky and Bell, and both the Navy and NACA were anxious to determine whether some change would be necessary for the tandem type.

It can be noted that the tandem arrangement has unique problems in that the rear rotor operates in the down-wash of the front rotor, thus reducing its lift slope with respect to that of the front rotor. Also, because of increased inflow, the rear rotor operates nearer tip stalling conditions than does the front rotor. Logically these factors tend to reduce the longitudinal stability of the helicopter. However, stability can be improved in the tandem type machine by positioning the center of gravity of the helicopter forward.

Another study underway seeks to determine how much static directional stability will suffice for good behavior of the tandem helicopter, particular- (*Continued on page* 56)

CAT SHOTS in the Dark

The lights of an incoming jet fighter trace this time-exposure path through the night skies off the stern of *USS Valley Forge*. The saw-teeth of light at lower left was made by the wands of a taxi signalman. Landing maneuvers are all traced in retrospect, via the streaks of light.

Thumb up-jerked signals "ready for takeoff." In World War II, night fighters proved their worth against Japanese in 1944.

By Lt. Cmdr.
GEORGE CORNELIUS, USN

YOU SIT TENSED in a night fighter cockpit as engine clamor beats against your helmet headset. Then tenseness melts into habit as you scan the pre-launch check-off list. You feel the aircraft carrier heel beneath you, turning into the wind. The catapult officer is signalling impatiently with his green wand: are you ready?

You force down thoughts of the blackness outside, flick on your wing and tail lights and brace back against seat and headrest. With eyes glued to the red glow of your instrument lights, you wait an agonizing second for the shock of the catapult shot.

Wham! R-r-r-oosh . . . slap! You're in the black! In seconds you have accelerated from a standstill to 90 knots airspeed. You fight your way forward off the back pad to raise landing gear and retract flaps. Flight instruments tell you all is well. You've made your gentle right and left turn and climbing airspeed is set up. The engine's bellow settles to a reassuring pulse and soon you'll have enough altitude to let the knots in your stomach untie. One more "night cat" shot lies behind you. Ahead lies your mission, and, at its end, a night landing.

In early attempts at night landing signalling, these lighted wands took the place of paddles. Cumbersome, they were soon discarded.

This device, a modified aircraft gyro horizon, was intended to prevent LSO's vertigo. It was also discarded.

Night carrier operations are the last word in aero-precision. They've come a long way in 27 years.

What brought you here? How does it happen that you find yourself able to carry out missions in total darkness? When did this business begin, and who started it?

* * *

All naval aviators who leave their flat-tops after dark and return before daybreak trace the origin of their work back to a certain April Fool's Day. What year, did you say? Try a guess. 1940? 1935? 1930? Further than that, chum! On April 1, 1925, Lt. Comdr. John Dale Price, USN, made the first night landing aboard a carrier. The ship was the *USS Langley*, Navy's pioneer flat-top, with many other famous "firsts" to her credit.

It's Vice Admiral Price now, Chief of Naval Air Training, who writes from his Pensacola headquarters:

"The type of plane was the Chance Vought VE9, a two-place biplane with 300 hp Hispano Suisa engine.

"I made a total of 13 landings under various conditions of deck lighting and darkness, from full moon to no moon and from all lights to no lights (except the illuminated wands of the landing signal officer).

"The first landing was made in full moon with a row of flood lights 30 feet apart along the flight deck. The landing area was illuminated with 'dead' lights three feet apart fore and aft which outlined the arresting gear.

"As illumination of the moon diminished from night to night, so did the artificial illumination. First to go was every other flood light, then all flood lights. Then the dead lights were extinguished, leaving only the ship's running lights and the illuminated wands of the signalman. The object was to test the minimum illumination necessary.

"All landings were made without incident. It didn't seem particularly difficult at the time because the VE9 was a swell little airplane—practically foolproof. The only trouble was that the *Langley* could make but 14 knots . . . against the 32 knots of the modern carrier. However, this slow ship speed was compensated for, in large measure, by the slow landing speed of the airplane.

"The operations were conducted off San Diego in perfect weather with a 24-26 knot wind over the deck (including the *Langley's* speed)."

* * *

Fundamentals of night-landing procedure and deck lighting have not changed (*Continued on page* 58)

This is the Landing Signal Officer of today, with fluorescent paddles and suit strips and goggles for protection from ultra-violet light.

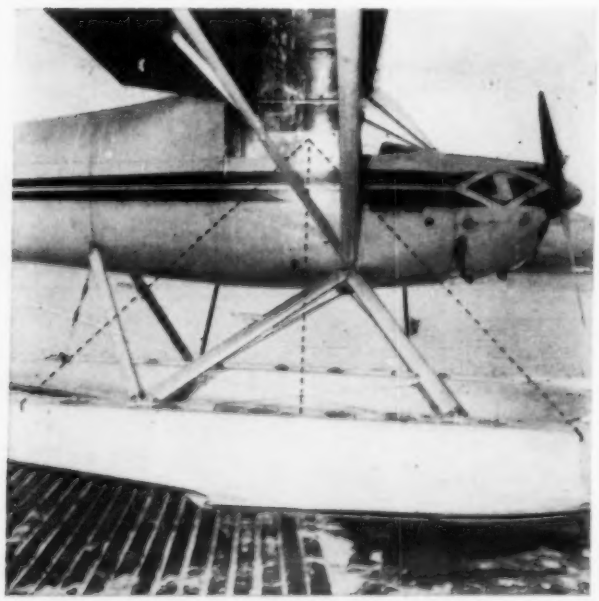
Two lines, two charts, a watch, a straight edge and simple arithmetic will prove that

Floats can help you navigate

By ALICE S. FUCHS

EVER WISH you had an absolute altimeter or a direct-reading ground-speed indicator? If yours is a float-plane, look no further; you're *flying* such an instrument. The very make-up of the plane—floats, fittings, fuselage, pilot's compartment—form a huge navigation instrument which will tell you ground speed and altitude above the terrain.

In order to read this navigation instrument you're flying, you need only one small alteration in the aircraft—two black lines on the float.



Two marks are placed on the float so that the distance between them is twice the distance from eye-level at the side window to the float beneath.

One word of caution before you toss your computer, pencil and navigation log out the window—this method is one of approximation only. If you were able to hold your head absolutely still, if you could fly exactly straight and level and could time with absolute accuracy, and if you were flying over water or exactly level terrain, this method would be one of mathematical exactness. As it is, the accuracy of the method depends upon your skill as a pilot, accuracy of timing, and levelness of terrain. It is as exact as you yourself can make it, and practice will help considerably.

The first step is proper placing of the two marks on the float. Sitting in the pilot's seat, pick a convenient eye-level and mark this spot on the side windshield. Measure from this spot directly down to the outer edge of the float. A piece of string stretched from the side windshield to the float beneath is probably the easiest method. Then, from the spot on the outer edge of the float below the side window, measure forward and backward on the float a distance equal to the length of the string. Make two black marks on the float at the ends of these measurements. Thus you have two lines on your float such that the distance between them is twice the distance from the float to the pilot's eye-level above the float.

By now, if you've been doing your measurements and marking at a seaplane base, you will probably have collected a little crowd of curious by-standers who will be further mystified if you explain that you are making your plane a ground-speed indicator and absolute altimeter!

The use of this method depends upon one thing—measuring the length of time it takes a ground object to pass from the front mark on your float to the rear mark. Obviously, to do this accurately you must hold your head as nearly still as possible and must have your eyes approximately opposite the spot on the side window which determined the placing of the two float lines. A bit of Scotch tape on the window can serve as a guide.

Straight-and-level flying is especially important while timing an object passing beneath the two marks on the floats. Obviously, if the nose of your plane is going up and down like a nervous jack-rabbit the timing of the ground object will not be especially accurate.

You do not need to watch the object all the time as it

passes beneath your floats. Merely note the starting and stopping time as it passes by each of the black float lines. A glance at the nose of the plane between times will help in keeping the craft on even keel.

It is better, if possible, to pick a river, highway, railroad or other straight line perpendicular to the line of flight, and mark the passing of this line rather than that of a single ground object. Side-drift sometimes makes it difficult to line up a single object with the float lines.

The timing presents a bit of a problem since it's no simple matter to keep the plane straight and level, watch an object on the ground as it passes between the two marks on the float, and at the same time check a timepiece. A pilot's chronograph or a stop watch is ideal for this purpose as you don't need to look at it to compute the time accurately.

Lacking a chronograph you may want to try a variation of the old photographer's trick of counting seconds: "One thousand one, one thousand two, one thousand three," etc., or "one hippopotamus, two hippopotamus," and so on. You may find a word combination that makes you feel a little less silly, but the result is the same. You can count your time without looking at a watch. Practice in counting seconds will increase your accuracy.

A little team work will pay off if you have another pilot in the seat beside you. He can hold the plane straight and level and can check the time when you call out the starting and stopping moments of the timing interval.

After you have got an accurate timing of the passage of a ground object between the float marks, you can use this information in three ways. If you are flying over water or land of known altitude and have a sensitive altimeter accurately set so that you know your exact altitude above the ground, you can find your ground speed very easily. Let's assume that you have calculated the number of seconds it takes a ground object to pass between the marks on the floats. If you go in for mental arithmetic along with your flying, you can divide your altitude by the number of seconds, multiply by 1.36, and you'll have your ground speed. Honest!

However, you may be the sort of pilot who'd rather change his own oil than engage in extra-curricular mathematics. If so, Chart 1 will do the calculations for you. Take the edge of your map, Weems plotter, or any straight edge, and lay it across the chart so as to join your altitude above the ground (*Continued on page* 46)

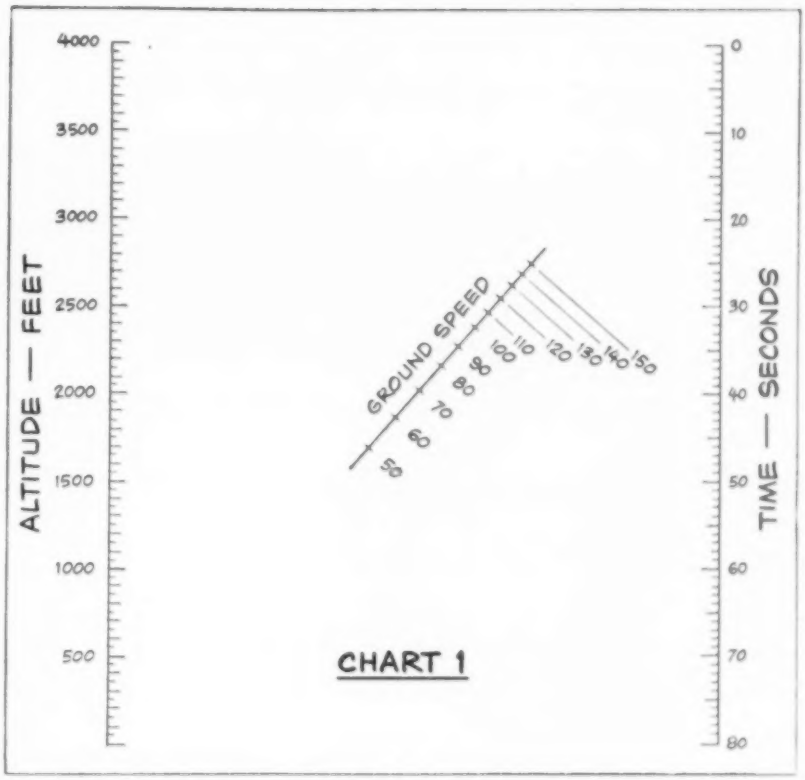


CHART 1

Note the time it takes a ground object to pass between the two float marks. Lay a straight edge across the chart, joining your altitude above the ground (measured up on the left-hand line) with the time (measured down on the right-hand line). The straight edge will intersect the slanting middle line at a point indicating your ground speed.

Time an object passing beneath the two float marks, climb 500 feet and time another object. Lay a straight edge on the chart joining the first time (read upward on the left line) with the difference between the two times (read downward on the right line). The straight edge will intersect the slanting middle line at the terrain altitude that you were flying before climbing the 500 feet.

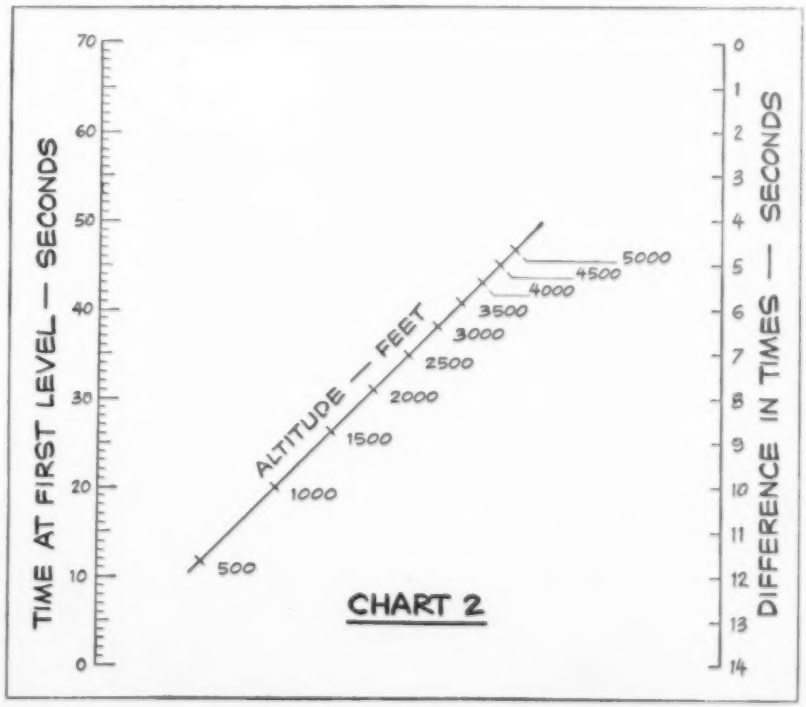
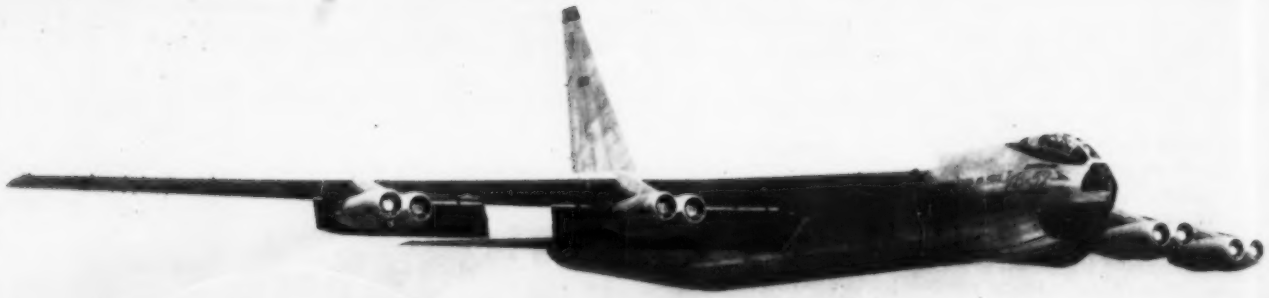


CHART 2

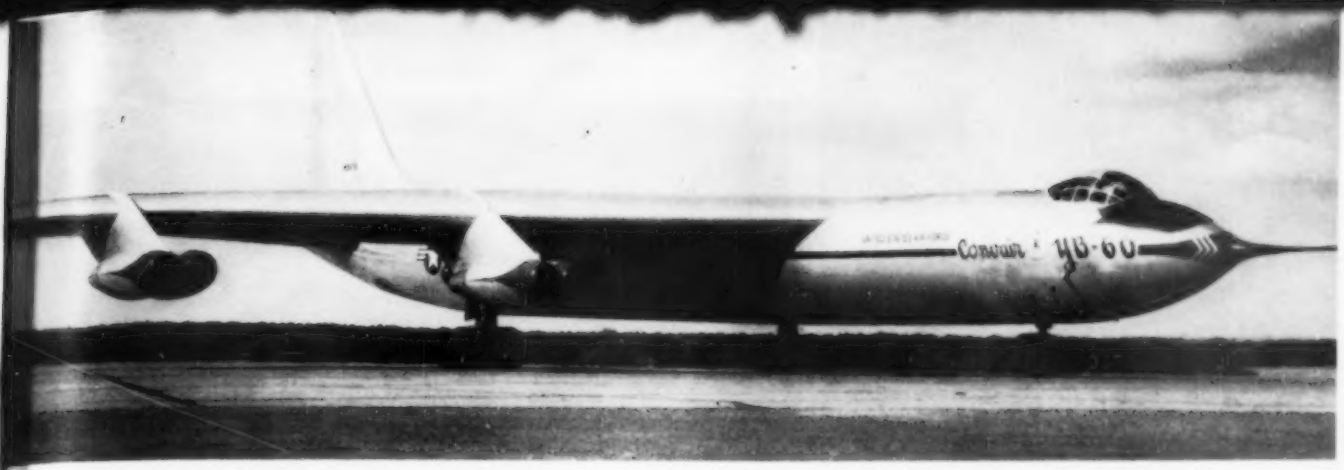


The Boeing YB-52 *Stratofortress*, new eight-jet heavy bomber of the USAF, remained aloft 2 hours, 51 minutes on its maiden flight. Circle at left shows A. M. "Tex" Johnston (right), project test pilot for the YB-52, and Lt. Col. Guy M. Townsend, co-pilot.

HAVE YOU SEEN?

D. F. Farrar of Vanderbilt University designed this tailless glider. Span is 26 ft., length 8 ft., wing area 90 sq. ft., expected maximum glide ratio 35:1. The pilot lies prone and ailerons provide control.

Lockheed Super Constellation prototype is first passenger ship with wingtip tanks. The 600 gal. tanks will give turbo-prop Constellations long range despite engines requiring 50% more fuel. Inventor C. A. "Kelly" Johnson, Chief Research Engineer, at left.

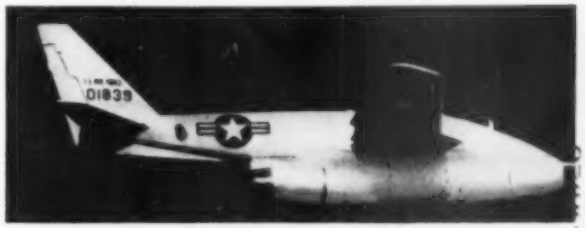


The Convair YB-60, USAF eight-jet heavy bomber, made her bow before the cameras in this picture taken at Consolidated Vultee's Fort Worth plant. The YB-60 is equipped with eight Pratt & Whitney J-57 turbo jets. At this time the plane was ready for engine run-ups.

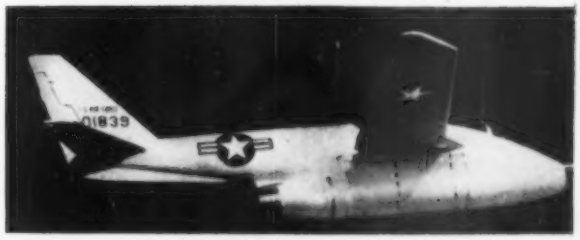
The Bell X-5, first plane ever built capable of changing wing sweep in flight, is the jet-powered newcomer to Bell Aircraft's "X" series of planes.

The 10-place Sikorsky S-55, first transport type helicopter to be certificated by the CAA, may herald a new era in commercial air travel.

Republic's F-84F *Thunderjet* fighter-bomber is still strictly regulated by security, but this picture is a dramatic disclosure of her armament.



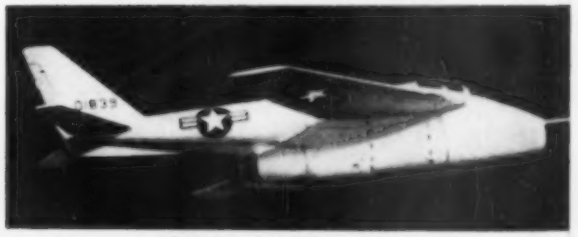
The Bell X-5 in normal flight . . .



The X-5 begins to sweep its wings.

Wings are moved back 50 per cent.

Sweep requires only 30 seconds.



Wings now in fully swept position.

The TREND is "TOURIST"

The modernistic Olympic Stadium in Helsinki, Finland (left) is a favorite goal for the thousands of travelers taking advantage of low tourist fares.

You save much and lose little when you fly overseas on a budget.

By the FLYING staff

IN AIRLINE circles, they're calling this "the year."

For air travelers, this is indeed "the year," when, thanks to the new transatlantic tourist fares, a summer vacation in Europe will become a reality for nearly 110,000 budget-minded Americans and Canadians.

The exodus from the great air terminals at New York, Boston and Montreal is now in full swing. At one minute past midnight on May 1, a *Constellation* of Trans World Airlines roared down a runway at Idlewild Airport and the tourist program was inaugurated.

By now, an average of nine tourist flights daily are being flown to Europe by the 11 U. S. and foreign airlines offering the new low-cost service across the Atlantic. These flights are in addition to the regular first-class flights which, by the end of October, will carry about 100,000 more to Europe and lands beyond.

What are the airlines cutting out of their service in order to make the tourist rates possible? Nothing essential, and only the frilliest of the frills.

The planes are the same safe and speedy four-engine airliners used for all first-class flights, with the same experienced crews.

Pan American, Swissair and KLM, the Royal Dutch Airline, are flying DC-6B's on their tourist runs. Scandinavian Airlines is flying both the DC-6B and the DC-6, while Sabena and LAI (the Italian line) are flying the DC-6, with Sabena using the DC-4 for extra sections at the peak of the season. TWA, BOAC, and El Al are using the *Constellation* for tourist flights, and Air France is using the new-type *Constellation*. Trans-Canada Airlines flies its tourist passengers in the *North Star* (Canadian-built combination of the DC-6 and DC-4).

Both TCA and El Al are offering nothing but tourist flights this summer. All the other airlines provide both first class and tourist service. To overcome a temporary equipment shortage, Sabena, the (*Continued on page* 53)

Love is really blind,
if a dreamy-eyed doll
can make a guy forget
he knows how to read.

I Learned About Flying From That! NO. 150

By 1st. LT. JAMES P. HOLAHAN

AT THE ROOT of man's troubles, there's always a woman. For instance, take that balmy day back in the Indian summer of 1945.

She was a WAC at the Coffeyville Army Air Base in Kansas. You know the type—cute, dreamy-eyed, with hair soft as cirrocumulus. She worked in the navigation section of Base Operations. More than one pilot lost himself in the clouds on her account, but none quite so literally as I.

It was after the war. Six pilots, of whom I was one, were given orders to fly a sextet of P-38's to Kingman Air Base in Arizona. To save time, the navigation section was given the chore of preparing our flight maps.

While preparing to take off, I discovered my adored had prepared the charts with her own little hands. I vowed to treasure forever those folded papers representing the terrain between Kansas and Kingman.

Our flight plan called for a loose formation via Tulsa, Amarillo, Albuquerque, then over the foothills of New Mexico to Arizona. Kingman was set deep in the mountains. It wasn't an easy target to find. You had to pass almost directly over the field to see it. In bad weather the surrounding peaks made descents hazardous. However, the map indicated a low frequency range station at the field and there should be no sweat.

The weather was perfect at the outset. As soon as "big bottom" got off the ground the left engine started to cough. I dropped out of formation to give the war-wearied engine a chance to make up her mind. Twenty minutes later she settled down to the powerful purr of her breed.

The others hadn't waited. I headed for Kingman alone, with Sweetie's flight map to guide me. But, because of the CAVU conditions, I didn't bother to use any maps—just flew a compass heading. Tulsa and Oklahoma City faded behind. I crossed the sagebrush country of Texas into New Mexico.

Time sped by. The mountains of Arizona were ahead, but now the sky took on a hazy appearance. The wind swung toward my nose. A check on groundspeed indicated 15 miles less than before.

Over Flagstaff the air got bumpy. Kingman was approximately 140 miles away. I tuned Winslow radio to check my position, which lay along the west outbound leg of this range station. My intention was to fly this outbound leg until I could pick up the east (inbound) leg of Kingman. Within 40 minutes I should be calling for landing instructions.

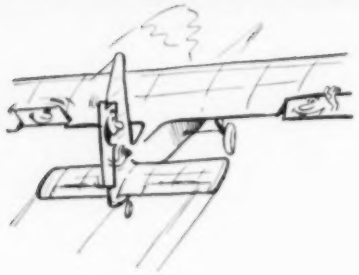
Now visibility was closing in. It started to rain. I could see thin streaks of water being carried along the plexiglass canopy. I was flying the right side of the beam, along the feathered edge. I noted that I had to correct several times to the left to stay on the beam. At first I believed I had encountered a strong south wind; later I became apprehensive and decided to consult the maps prepared by my Coffeyville dream girl.

I found I was flying 20° left of the beam heading marked on the map. I tried to tune in Kingman on 347 kc but kept getting a strong "on course" signal from a station with the identification PC. I again looked at my maps. There was no other beam in the vicinity, according to Sweetie. PC could stand for Prescott, a town about 50 miles south of course. But the map showed no range at Prescott.

The situation was confusing. Finally I recalled the words of an instructor back in ground school: "Check the publication date in the lower right corner of your map." Sure enough, there it was—August 10, 1944. And here it was, September, 1945, more than a year later. I had been given an obsolete map! Adam and the apple all over again!

Meanwhile forward visibility, which had been closing in, had dwindled to two or three miles. In my confusion over the maps and radio ranges I hadn't been paying too much attention to the weather. (*Continued on page* 42)

AILERON ANGLES



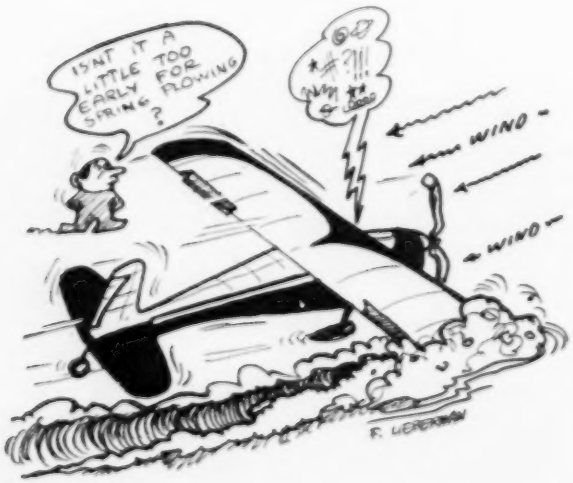
"Elementary!", you say; yet crash reports continually point to lack of understanding of the wing foil.

By FRANK SHAW

"I BOUNCED rather high on landing and, with the airplane in a semi-stalled condition, the left wing dropped. I tried to level the wings with aileron but . . ."

It is unnecessary to quote further from the sad, shattered ending described by this pilot in his accident statement. With more than 2,000 flying hours to his credit, that airplane driver didn't know when the stick should be wobbled sideways and when it should laterally let be.

Aircraft accident investigators gather much information from wreckage and a study of conditions at the time of a crash. If a pilot is able to take pen in hand after a cockpit calamity, the hypothesis hunters can deduce causes of destruction from obvious errors in flying technique. Such errors are often unknowingly mentioned in the pilot's statement, as this one was. Our age of aeronauts does not know all it should about wing foils—especially ailerons.



Those outboard wing sections, primarily responsible for making an aircraft roll around its longitudinal axis, are worthy of profound consideration.

The ailerons are hinged movable surfaces at the trailing edges of the airplane wings—in case you didn't already know.

"Basic knowledge!" you say. "Everyone reading FLYING Magazine already knows about the ailerons as a set of control surfaces differentiated from the rudder and elevators." Yet pilots have indicated through crashes, sloppy landings and thousands of hours of hangar flying that the ailerons are often abused, mis-used or un-used.

From the flying box-kite days of the Wright brothers to the sleek supersonic swiftness of tomorrow, aeronautical designers have been confronted with a camber caper known as aileron drag. Every airplane flying today exhibits this peculiarity and it can be demonstrated to those interested. It helps to explain many accidents like the one quoted above, as well as directional deviations.

In level flight at cruising speed, move the stick quickly from side to side. Notice that the nose begins to move in an opposite direction to the bank. That is caused by aileron drag. Theoretically the valid explanation is lift vs. drag. When the stick is moved to the left, for example, the left aileron is raised into an area of decreased pressure about the wing surface while the right aileron is depressed into the relatively full force of airflow below the wing, increasing camber, lift *and* drag. This dragging aileron slows the wing-tip and you feel a yawing motion away from the direction of bank.

At slow flying speeds, and especially after a high bounce landing, when that sinking sensation takes over with a low left wing, movement of the stick to the right will only aggravate the situation. Aileron drag may completely stall the already low left wing. Thus low and slow pilots who admit they tried to pick up a semi-stalled wing with the ailerons indicate misuse of banking controls and a probable cause of accidents. ADVICE: Don't make high bounce landings. If you should, (*Continued on page 56*)

At the height of his invasion, the tent caterpillar covers every stone and fence post with his horrid, wriggling brocade.

Operation Caterpillar

By GERALD B. SMITH

FLY INTO ANY Minnesota airport this month and ask for the boss. More than likely a mechanic or a snack-bar waitress will tell you: "He's away at war for three weeks."

Ask further, and you'll be rewarded with some of the details of "Operation Caterpillar," in which every Minnesota pilot with aerial spraying equipment has promised to take part.

Just about the time you read this, the Minnesota operators are going about their daily routine tasks at the airports with one ear tuned for the signal that will advise the arrival of "zero hour." With that signal, members of the Minnesota Airport Operators Association will drop everything else and head for the resort areas of the North woods country.

"Who is the enemy?" you are perhaps wondering. The answer is, "the forest tent caterpillar—often referred to as the army worm because of the irresistible way he moves, rank upon rank, million upon million, as he devours the foliage of all broad-leaved trees and shrubs."

Early spring reports from the Minnesota Department of Agriculture indicate that the state's entire forest area will be under attack as the young worms emerge from the winter egg cycle and set out to ease their hunger.

For several months, operators and pilots have been planning the spraying project in cooperation with the resort and summer home owners. The sprayers hope to save at least 100,000 acres of forest playground from being denuded by the ravenous insects during the early summer.

The aviation industry, at its midwinter meeting, heard the plea for a new kind of concentrated, cooperative spraying project. A. W. Buzicky, associate state entomologist at the University of Minnesota, warned: "This summer will probably see the peak of the forest tent caterpillar epidemic." He showed how the worm pest has been developing in a widening circle during the past several years.

(*Continued on page 64*)

Here's a section of Virginia, Minn., airport, rallying point for the Minnesota forest spraying operation. In the insert is R. G. Glumack, sparkplug of the private project.

Women's Air Race

Claire McMillen Walters (above, right) and her co-pilot, Frances Bera, placed first in last year's TAR. Below are the Dietrich twins, Marion and Jan, who came in second in 1951.

By BETTY RYAN WOLFE

THE FOURTH of July means fireworks, picnics, parades and patriotic speeches. This year, it also means the start of the sixth annual All-Woman Transcontinental Air Race.

Promptly at noon on July 4 the first lightplane will take off from Orange County Airport, Santa Ana, Calif., to be followed at 15-second intervals by 70-odd more private planes. The race will officially come to an end five days later at Teterboro Airport, N. J.

The hopes of 125 pilots and co-pilots, of dozens of "sponsors," and of assorted husbands, parents, children and grandchildren will ride with these little planes as they skim eastward over deserts, mountain ranges, broad prairies, rivers, tiny hamlets and sprawling cities, and on until the Atlantic Ocean lies ahead.

A few of the speedier entrants—the *Navions, Bonanzas*, Bellancas and Cessna 195's—will check in at Teterboro late the second day of the race, with three days left for New York sightseeing. The early birds will not necessarily win the race—an elapsed time, handicap affair which evens the odds for all contestants.

The All-Woman Transcontinental Air Race, popularly known as the TAR, is sponsored by the Ninety-Nines, and open to any woman of any nation, provided she has a private pilot's license or better. She may fly any stock model U. S. aircraft, 1946 vintage or later, not exceeding 300 hp. Two-way radio is mandatory.

Automatically barred from the race, because they run it, are the overall chairman, Mardo Crane of Los Angeles;

Winning smiles, following the 1951 TAR, are worn by, left to right, Jan Dietrich, Claire McMillen Walters, Frances Bera, Marion Dietrich and Edna Gardner Whyte. Edna placed third in a Cessna 140.

A record field of fliers will enter the sixth annual

TAR

Marjorie B. Davis of New York City, the terminus chairman at Teterboro, and the five Ninety-Nines trustees—Betty Loufek, Beatrice Medes, Anne Rambo and Ethel Sheehy, all of California, and Kay Brick of New Jersey.

Three former trustees, Betty Gillies and Barbara London of California and Arlene Davis of Cleveland, O., resigned in order to be eligible to participate in the race. Last year, Betty Gillies and her 17-year-old daughter, Pat, also a licensed pilot, were outstanding TAR participants. Pat is now a student of aeronautical engineering at Stanford University, and she and her mother both are making plans for this year's race.

Applications for entry into the sixth TAR may be filed between May 1 and June 20, and this year will be limited to 80 planes. Past experience indicates that a few of the entrants will be forced to withdraw at the last minute, due to inability to have their planes ready and at the starting post on time.

All participating planes must be turned over to the Race Committee at Orange County Airport before 5 p.m. on July 1. The CAA impounds the ships at that time and checks them thoroughly to be sure that each is a standard stock model with no modifications of any kind.

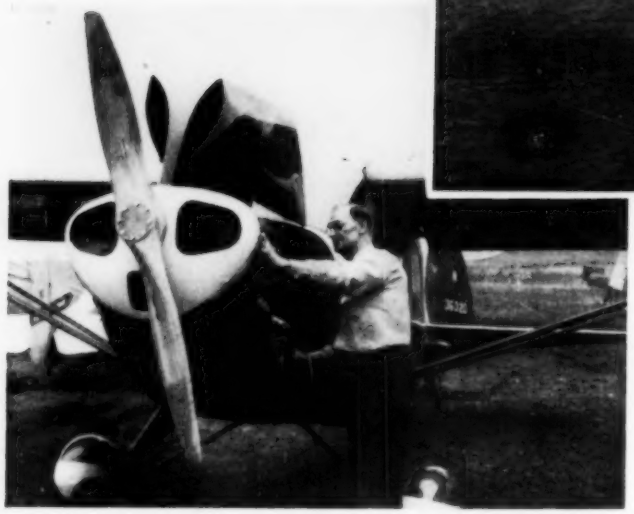
Only the actual pilot of the competing plane need be a licensed flier, and she may carry as many passengers as she wants to, provided all are female and at least 16 years old. The speed vs. weight problem generally limits the payload to a single co-pilot, and in most cases she is also a license holder.

Betty Gillies and her 17-year-old daughter, Pat, were a unique family combination in last year's TAR. Both are licensed fliers.

The mechanics of clocking the plane arrivals at way stops makes the presence of a co-pilot desirable, however much her weight may cut into the cruising speed. At each designated stop along the route, the pilot taxis up to a time clock to have her elapsed time recorded. If there is a co-pilot aboard, she takes a flying leap out of the cockpit to thrust the special log book into the timing mechanism. A pilot flying solo must cut her engine and tend to this detail herself, sometimes at the cost of a few precious minutes. On takeoff, the same procedure is followed in reverse.

The time clocks have been a feature of the race since 1949. Until then, the various airport towers had been clocking the arrivals, and this led to some human complications. One tower operator, under the spell of a pretty pout and a pair of sparkling eyes, reconsidered his first estimate and cut 20 minutes from (*Continued on page* 50)

FLYING's CHECK PILOT



P. C. Daugert, Taylorcraft's production manager, demonstrates the ease with which the *Tourist* may be inspected. Note the hinged cowling.

TAYLORCRAFT "Tourist" Model 15A

By ED HOADLEY

THE DAY was grim and murky. From my comfortable seat in the vermilion and cream Taylorcraft *Tourist* it was hard to tell where the gray-black of the Pennsylvania hills stopped and the amorphous nothing of the atmosphere started.

We were cruising from the Conway Pittsburgh airport, home of Taylorcraft, Inc. Ben J. Mauro, Taylorcraft President, and Al Bennett, Vice President and Sales Manager, were with me on this check flight. We were headed for Miller's Airport in Alliance, Ohio, the ex-production center for Taylorcraft and the home of C. G. Taylor who has brain-trusted the series of lightplanes bearing his name.

Visibility of the airplane from our position at 1,500 feet was excellent—and by visibility I mean the physical ability to see out—not the objects seen, for they weren't. From my position on the right side I could see in an angle from six inches below the horizon to almost vertical. Laterally I could see from the bottom of the wing to almost beneath me. Rearward visibility was good as I could see almost half of the stabilizer. The only blind spots were directly overhead, beneath, and to the rear.

The engine hummed along in comforting fashion. We indicated 117 mph when not easing on the carburetor heat. With 11,000 flying hours, Al Bennett had learned to watch for carburetor ice, and we were having a spell of it this spring day. The noise level wasn't bad—about the same as in my Stinson *Station Wagon*. We could talk back and forth in the front seat, but Ben had to lean forward from his seat in the rear to join in the conversation.

Our take-off had been a work of art. The Conway-Pittsburgh airport is shaped roughly like an "L" with the long runway parallel to the Ohio River. The small part of the "L" lies east and west. With a wet wind drifting across the field from the east we started our take-off downwind on the short 1,800 foot runway. The *Tourist* slowly gathered speed downwind until the ground left us. The airport is situated on a high cliff overlooking a valley full of houses, closely woven railway tracks, steel mills and the muddy and meandering Ohio River. There was no hesitation on the part of the Taylorcraft. When Al pulled back on the wheel at the end of the runway the airplane was solidly airborne.

Heading north we cruised over Al's farm. He is a great believer in practicing aviation as well as selling it. He has constructed a landing strip next to the "country place" and commutes to work each day by air.

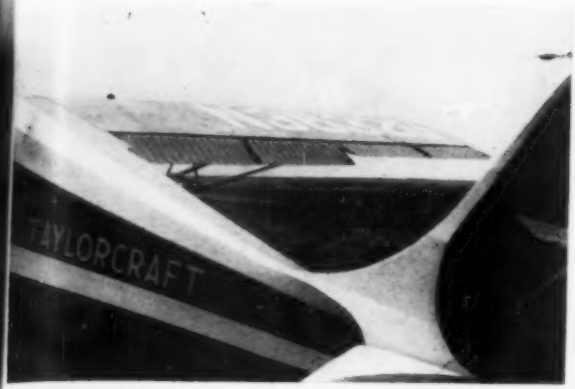
"It takes me 40 minutes to drive from my home to work" he said. "In my Taylorcraft I can do it in six."

"How about the weather?" I asked.

"You'd be surprised how little weather affects you if you know the route. I've been with Taylorcraft since February, 1951, and have missed flying to work only three or four days during that time."

From the farm we flew a compas heading of 315°. This brought us over Lisbon, Ohio, and into medium rain-showers. Ceiling remained high but visibility became very ragged. The airplane was quite stable and required little effort to keep it level, in spite of the weather and lack of a ball-bank indicator. At 11:47 A.M., we saw the long reaches of Milton Dam reservoir and started looking for the airport at Alliance. At first we couldn't see it, then, on circling, found it directly below.

As the wind held from the east we swung into pattern at 800 feet, carburetor heat full "On." Al pulled flaps at



Ailerons and flaps, running the length of the wing, are of ribbed aluminum alloy construction. A wide gap separates them from wing proper.

C. G. Taylor, Ben J. Mauro and Al Bennett inspect *Tourist* wing slots. "We've slotted everything," says T-craft, to get stall-resistant wings.

500 feet and we eased back to an indicated 80 mph. The airspeed dropped to 65 mph and the airplane entered a normal glide angle. About 20 feet high Al pulled the wheel back and the Taylorcraft eased on down. With full wheel back in our ribs the airplane three-pointed on the runway. "This is the customary way to land T-crafts. This way there is no float," he pointed out. This was true, for she broke at an indicated 40 mph and was rolling at a clip down the pavement. There was no sign of wanting to leap back into the air such as pilots have found on the "B" models. We were greeted by "Rus" Miller, owner of the Field, at 11:51 A.M., exactly 32 minutes ground-to-ground from Conway, Pa. Ben Mauro said the distance was roughly 50 miles. Al added that we had detoured once to see his farm, and once when we were finding where we were "at."

Within a short time the grand-pappy of all the Taylorcrafts drove up—C. Gilbert Taylor, a Vice President and one of the directors of the present organization. He is known as "C.G." to his intimates, and this has no reference to "Center of Gravity." Taylor is one whose eyes possess that "over the horizon" look. They sparkled when he looked over his latest design, the *Tourist*. As he discussed the airplane and business with Mauro and Bennett I thought of the old Taylor *Chummy* of 1929, then the Taylor *Cub*, and the Model A—up and down like aviation itself, with cycles of feast and famine, never giving up. The BL model, the BC, the BC12D slowly raised horse-power and speed. Then came the war-horse L-2 and the post-war models (including a 125 hp. liaison ship). When the Company was reorganized as Taylorcraft, Inc., they inherited a four-placer. Taylor revamped it, re-designed the prototype, and here it was. It was a long way from the *Chummy* to the *Tourist*. Taylor still serves in charge of engineering, designing, and consultant with the new company.

I climbed into the back seat for the return trip. Ben Mauro elected to co-pilot, with Al at the controls. The foam rubber cushions of the rear one-unit seat were easing, and it was good to be able to stretch my legs. The floor-board had been dished out several inches for proper heel position. Instead of riding with knees pushing into the front seat and your ankles bent or twisted, you can sit back here as comfortably as in a rocking chair. Experimenting, I swung my torso forward, simulating a crash landing, and my head didn't come near the front seat. This is good design. As an additional comfort and safety feature, the production models have separate doors for the pilot, the "better-half," and the children in the back seat. The spot where a fourth door can be installed (optional equipment), has no structure in it, so an additional door is available.

The airplane is easy to start. The sequence is (1) mixture full rich, (2) two shots with the primes, (3) throttle cracked, (4) "Clear?" loud and clear, (5) starter button, and (6) key switch to "both" position. As we taxied out I checked ground vision ahead, and the front cowling hides about two inches of the runway. After proper magneto check Al let her run—tail down. She hopped a couple of times then climbed on out. I guess-timated some 500 feet for we were off long before the hangars slid by. Using a left-hand traffic pattern we broke out over the large reservoir at Alliance, and settled on a compass heading of 130°. Back into the murk at 1,200 feet, the airspeed steadied at 115 mph and the tachometer at 2,350.

Rear Vision Good

From my position in the rear I could enjoy the scenery straight down, even if there was no horizon visibility. The rear window is quite long—longer than the average auto's. After we left Salem, Ohio, we climbed on up to 2,000 feet. Using half throttle, no flaps, Al slowed the *Tourist* down until the airspeed nicked 40 mph. She hung there like a picture on the wall. Recovering, and clearing himself, he repeated the maneuver with flaps.

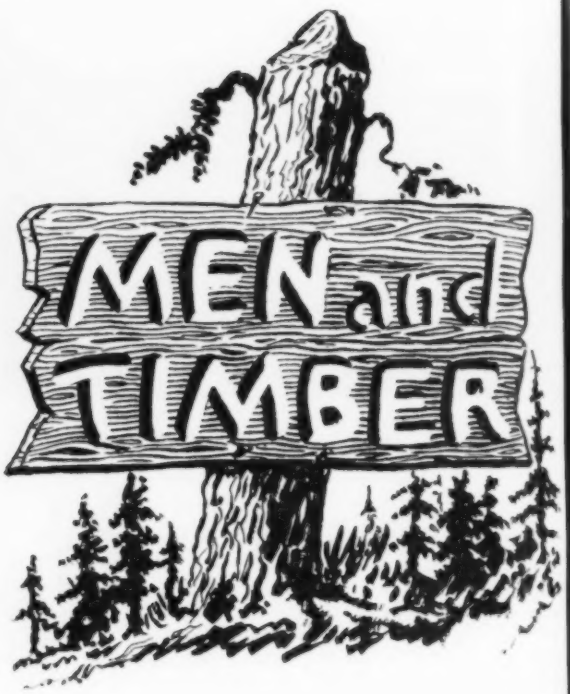
This time the airspeed needle dropped below 40. "Thirty-eight!" Ben called out. There was a big "no spin" placard on the instrument panel and Al previously had told me that the airplane was very hard to spin, so I was taken by surprise when he pulled the wheel straight back into his stomach. I figured on a loop, but when he stopped her vertically, I caught my breath for a tailslide. Al then released the wheel slightly and she stopped dead still for a second, then dropped over on a left wing. Here's the spin, I thought, but it recovered normally without aid. It's surprising the amount of stability the ship has without showing it in dihedral or rigging.

Then the wheel was horsed back again. Just before the break, Al rolled the wheel left and right. The plane was under pilot control, though it had that sinking feeling. It was interesting to go through part of the check ride from the rear seat. One receives entirely different impressions.

40 mph Stall Standard

The engine "burped" from ice a couple of times so we levelled off and flew on down to Beaver Valley and home base. The smog and smoke from the steel mill funnels created almost instrument conditions, but with a good ceiling we had no difficulty in making a proper approach over the Ohio River to the field. (*Continued on page* 60)

Landing strips aren't always handy when fire breaks out in western forests, but the fire patrol pilots don't need much room.



Men of vision and daring made a science of aerial fire-fighting in the land of the tall timber.

By DALE WHITE

THANKS to aerial control, western forests no longer suffer devastating, large-scale fires. Twenty years ago a 100,000-acre fire was not unusual. Today, aerial scouting and supply and the early attack by parachuting firefighters make a 700-acre blaze a headliner.

When the fire patrol plane over the Beaverhead national forest in southwestern Montana radioed that a lightning-caused blaze was mushrooming on inaccessible Trail Creek, Assistant Forest Supervisor F. C. Curtiss knew his forest was in for trouble, but not disaster.

Trail Creek lay back of a jumble of mountains, unapproachable save by tortuous foot trail. Unchecked, a fire there could romp over ridges and wipe out timber, remote mining and logging camps, livestock grazing on summer range, camper units and summer homes. Even though the Beaverhead was well organized to recruit ground firefighters quickly and get them on their way supplied with food and equipment, 16 hours would elapse before large-scale ground attack could commence. The fire being of the fuel type, with medium rate of spread and extreme resistance to control, a quick attack was imperative to contain it within the creek drainage.

Curtiss telephoned Fred Fite, regional manpower dispatcher at Missoula, to ask for six smokejumpers. "Get your ground crew on their way," Fite ordered, "and let 'em travel light. We'll drop extra fire packs with the jumpers and send over hot dinners and bedrolls by 7."

At the parachute loft on Hale Field in Missoula, Fred Brauer put Fite's order into action. Six jumpers and a spotter were summoned on the inter-com. Jack Nash helped gather firepacks, rations, cargo chutes and jumpers' chutes and then the two men loaded the Ford Trimotor.

A call from Fite to the Johnson Flying Service office next door to the loft resulted in an order scribbled on the trip board: "Ford Trimotor, 6 jumpers, Trail Creek, SAP (departure soon as possible), BJ." "BJ" meant the pilot would be Bob Johnson himself, veteran gray-haired dean of mountain pilots who with his late brother, Dick, pioneered the earliest aerial mountain freighting, cargo drops and smokejumper flight techniques. He would dispense with the drop-spot briefing usually given his 11 pilots who have to rack up 2,000 hours *mountain* flying experience before being hired for an additional three-year training practice. It takes skill and experience to get the *Travelairs*, Fords and Douglas C-47's on and off short, dirt, primitive area strips usually boxed in tight by canyon approaches and tall timber.

Pilot Jack Hughes and his dropper would deliver hot dinners and bedrolls at tree-top level in the narrow ravine despite vicious air currents and smoke.

In spite of the speedy action, Trail Creek "blew up" next morning and was out of control. Curtiss called a fire council with his sector bosses, then put through short wave to Fite: "We'll need two more 'dozers, another 150 men and a second fire camp setup." He added: "Can you give us help with the photo ship? Smoke's so thick we can't find the right logging roads leading toward the fire."

Within 30 minutes Fite had the 'dozer crews dispatched and the first contingent of 150 fire-fighters preparing to board the Doug for the first shuttle trip to the fire. With a cool, jackrabbit style of flying around and over the fire, the photo ship pilot maneuvered the twin Beechcraft to allow the photographer to get his shots. The film was developed in the plane's portable dark room and relayed to the fire camp by means of a message cartridge with orange streamer attached. Thanks to aerial supply, the fire camps could be located near the live fire and set up speedily—an impossibility when men had to rely on pack stock transportation.

From that point on, the fire was fought by ground methods and pinched off before it could spread to another ridge. Meanwhile, the planes (*Continued on page* 62)

Practice jumps into timber adjoining smokejumper training headquarters keep the aerial firefighters in trim for the real thing.

Jack Hughes, Montana's first licensed 'copter pilot, takes off to pick up jumpers and gear for return to base.

Glen Smith (center), smokejumper squad foreman and spotter, loads *Travelair* with fire packs after checking equipment of the jumpers.

Honolulu, here we come!

"Aole oe i noho a ike ia Hawaii."

By ZELMA HELMES

FROM WEEK END junkets in Wisconsin to a grand Hawaiian air tour—that's the saga of Wisconsin's flying caravan.

Howard Morey, Wisconsin's Cessna distributor, believes that his customers should get the most enjoyment possible out of owning planes. Two years ago he spread the word to his congenial clients, with the result that they were soon making regular week end trips to resorts and scenic spots within the state. By Fall, 1950, the aerial adventurers spread their wings and took off for four days in the Black Hills of South Dakota. Other flights were made to Guatemala and to Quebec. The collective log books show 25,000 hours of flying time, over 2,500,000 miles flown, and not a single mechanical difficulty or a scratched "fender."

The Hawaiian trip brought together 31 passengers in eight planes. The group included 10 charter members who had been on every previous expedition—the Al Johnsons, the Dr. Frank Deans and the Howard Moreys, all of Madison; the Dr. Herman Heises of Milwaukee and the Steve Wittmans of Oshkosh.

Steve Wittman, Wisconsin's best known flier, is a nationally known racing pilot and designer and builder of midget planes. He invented the Wittman landing gear that is used on all Cessnas.

Dr. Heise is an amateur photographer of note and his wife was the 1949 winner of the women's "Powder Puff Derby." Both Mrs. Dean and Mrs. Wittman are also licensed pilots.

Although flying is considered by some a young man's game, our privately owned planes were flown by pilots ranging in age from 30 to 65. Only four were professional pilots. Others were, by profession, farmers, automobile dealers, manufacturers, implement dealers, bankers, insurance men, inventors, engineers, realtors, lawyers, lumbermen, doctors, an interior decorator and a florist.

We did not try to fly in formation but mapped each day's course so that we would land at the night's destination before sundown. We were never in the air more than three hours at a stretch, and we avoided all the fatigue of surface travel. For comfortable travel, we consider the private airplane as far ahead of the automobile as the automobile is ahead of the horse.

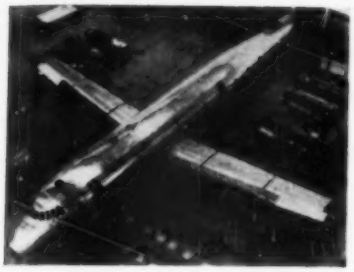
My husband, Lloyd, and I flew (*Continued on page* 63)

In Foreign Skies

MEXICO'S LARGEST

The Mexican Department of Defense reports that Santa Lucia Air Force base, largest airfield in that country, will be completed by September. The new base, 25 miles from Mexico City on the Pachuca Highway, is being built at a cost of $6,944,400.

BRITANNIA SPROUTS WINGS



Shown here is a *Britannia* airliner nearing completion at the Bristol works in Filton, England. The 107-passenger giant has a wing span of 140 feet, is 114 feet long and stands 38 feet, 8 inches in height. Her four Bristol Proteus III gas turbine engines, equipped with deHavilland steel-blade propellers, will give a speed of 370 mph at 35,000 feet. BOAC has 25 of the planes on order and it is reported that the *Britannia* will replace the Short *Solent* on the trans-Tasman run of Australia's Tasman Empire Airways, Limited. The planes will be in service by 1954-55.

ENDURANCE

French soaring enthusiasts are still applauding the feat of Charles Atger, who took an Arsenal Air. 100 #12 sailplane aloft April 2 and remained airborne for 56 hours, 15 minutes, a world record for a single seater.

SKY FERRY

New British cars are being rushed to European markets aboard Bristol Freighter aircraft. The Freighter can carry three cars and 20 passengers, and it's now possible for a British motorist to take his car along when he makes the Channel crossing by air. Four thousand cars have made the air crossing in the past year.

FRENCH JET

France's SNCASO has come up with a new formula for a "medium jet liner." It is a twin-jet type, with the main power plants augmented by small assistance jets. Thus the controllability and safety of four jets is paired with the economy of twin jets. The plane is especially designed for operation in hot countries and out of high altitude fields.

NEW TAIL

The Dutch Ministry of Civil Aviation requires that the de Havilland *Tiger Moths* used in its Government Civil Flying School at Ypenburg must have a special tail designed to slow the spin action. Increased fin area (pictured here) causes greater pressure on the rudder, which is noticeable when operating the rudder bar. The Dutch Air Force does not consider the modification necessary, so standard and new-style *Tiger Moths* are both common at Ypenberg.

BITS FROM BEA

British European Airways is in the news with its announcement that it has adopted for all its aircraft the Decca Navigator System, providing pilots with an automatic pictorial flight log, in preference to the American system of Omni-Range and Distance Measuring Equipment. BEA considers the Decca System the best solution to its European navigational problems. BEA also has now added the British luxury aircraft, the Elizabethan, to its routes between London and the Continent.

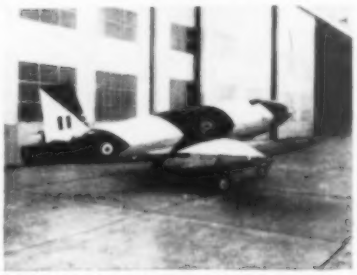
VERSATILE AMPHIB

The Piaggio P-136L, Italy's five-place, gull wing amphibian is in production both for civilian and Italian Air Force use. All-metal and powered by two engines in the 180-250 hp range, the P-136L cruises at 150 mph and has a range of about 900 miles.

AIR COLLEGE

The International Civil Aviation Organization (ICAO) is assisting the Indonesian Government in organizing and operating a national aviation college to be established near Djakarta. The college will train Indonesians as air and ground crews to operate airline services.

TESTING TARGETS



Unmanned

Manned

Australia's first jet aircraft designs, in both piloted and unmanned versions, are being flight tested at the vast Woomera Rocket Range. The craft are radio-controlled, jet-propelled target planes, designed and developed by the Government Aircraft Factories. A single Armstrong-Siddeley "Adder" 1 turbojet powers the planes, which have a wingspan of less than 20 feet and are about 22 feet long. Piloted model and drone are similar in size, shape and weight, except for the absence of a cockpit and canopy on the unmanned version. The drone also has a central skid landing gear and a special tricycle trolley which is jettisoned at the instant of take-off.

ALARM CLOCK NAVIGATION

Was very much interested in the article by Alice Fuchs (Alarm-clock Navigation, FLYING, March). Thought you might be interested in some minor changes I worked out while making one for my ship.

The cut you printed will not fit the suggested clock. (Corrected diagram was printed in Mailbox for May.—ED.)

For many ships the top ground speed of 120 or 130 is not fast enough so I made mine to extend to 140. The principle is simple and can be done with any ordinary distance-time computer.

I found that if one colors only the groundspeed circles it is much easier to read. Each should be colored a different color. I also found that if the minute hand is shaved down to a much less thickness, or rather I should say less width, then it is much easier to read where it crosses the distance line. With colored circles, white spaces between the circles, and a thin black minute hand, it is much easier to read the instrument.

Instead of using the alarm hand to record the groundspeed and mark it for reference, I decided that when the clock was not in use as a groundspeed indicator, I would set the alarm at one or two o'clock, turn the clock on at take-off and change gas tanks when the alarm sounded. To do this just do not cut out the section as Mrs. Fuchs does but rather lightly ink in the alarm dial.

One final thing—I feel that suction cups are not as reliable as a bracket. We will have the clock so arranged that it will slide into a permanently mounted bracket using a pressure effect to hold it in place. And be sure to watch for any effect this metal might have on the compass.

NUMA P. DUNNE, M.D.

Oakland, Calif.

P.S.—Since writing the above I found that it is a great help if one uses a movable marker that can be set from the outside of the glass. I refer to the type of marker used on home and office barometers where one wishes to record the pressure by turning a hand, the knob of which extends through the crystal to the outside. I had a hole drilled through the glass and one of these hands put in by my jeweler. The following day the crystal cracked so he made one out of plexiglas, easy to cut, drill and very durable. It works fine. By having this hand installed one can set ahead the ETA with the marker, set the minute hand at 12, and when the two meet one should be at his ETA. Very simple.

N. P. D.

OLD BABEL PROBLEM

In the article entitled "Tracking the Bird" (FLYING, April), the author states that it is necessary for a plane to fly out over the course which is used to test fire pilotless missiles, and warn any ocean-going craft to clear the course before firing is undertaken.

He further states that in one case a Norwegian freighter could not understand English, and the plane pilot was forced to use the international Morse code.

How is it possible for one person to talk to another, even with the Morse code, if they do not have a common language between them?

CHARLES L. SMITH

Ithaca, N. Y.

● *Reader Smith adds that the problem kept him awake nights, and the same can be said for Ye Ed. Maybe the Navy will supply the answer.*—ED.

OKEY DOKE

Pilot Steele and Crew Chief

I am writing regarding an article by Mel Lewis, "I Learned About Flying from That" (FLYING, April).

The airplane the author is leaning on is described as his F-51. I am quite positive that F-51 in the picture sure looks like the one I flew overseas. You see, I named my plane *Okey Dokey* after my middle name, which is Oke. From what I can read of the name on the plane in the picture it sure looks like one and the same.

I flew from Iwo Jima, making several missions over Japan in my *Okey Dokey* and later ferried it to Saipan after the war was over. The ferry flight occurred December 2, 1945. I am enclosing a picture of myself and my crew chief standing alongside my plane.

ALVAR OKE STEELE

Evanston, Ill.

● *It certainly looks like the same F-51. It seems obvious that Pilot Lewis must have "inherited" the plane at Saipan after Pilot Steele had ferried it to that spot.*—ED.

TALL ORDER

I am a Swedish young man and I'm reading your newspaper every month. I like your newspaper very well, and I have a wish. I, and many with me who are interested in flying, want to have your FLYING translated to Swedish. If this would be possible I believe many more Swedes would read your newspaper, but also Danes, Norses and Finnishes. But my greatest wish is that your newspaper will contain more about international transport flying, and if you could give out a special issue every year.

BERTIL NORSTROM

Stockholm, Sweden

● *The Swedish language order is a tough one at the moment, but we'll do our best on the international transport theme. Charles Corddry's article on "Jet Transports" (FLYING, June) was a start in this direction.*—ED.

BALANCE OF POWER

The April issue of FLYING just arrived. After a quick thumbing through the first thing I read was your editorial. Perhaps that I thought it was good, excellent in fact, is due to the fact that it states what I have believed for a long, long time.

BUT, who puts all of this "government . . . aircraft industry" in front of us all the time? FLYING has been as guilty as anyone. What do I see when I look over my past covers? Military aircraft. What do I read about? Military aviation. April issue score: nine features on military, only four on private flying. But even April seemed a little more "civilianized" than usual. Did that Cessna on the cover fly in front of those Boeings by accident?

Offhand, I'd say that your FLYING magazine is a good two thirds on the military side. Why not even it up and make it about fifty-fifty?

HENRY SHOUSE

Thule, Greenland

● *We're still doing our best to even the the proportions. Would you believe that this week we even got a letter complaining about too much civilian news?*—ED.

RIGHT NAME, WRONG PICTURE

In your February issue under Military News you mention Lt. Joseph L. Bowler but the Captain whose picture appears with the article is Albert Sebourn. Capt. Sebourn was formerly Commanding Officer of the 8191st Helicopter Det.

PFC. DAVID HACKETHAL

c/o Postmaster

San Francisco, Calif.

● *You're right. Inadvertently, mention of Capt. Sebourn was cut from the item.*—ED.

PLANE FAX

Quick picture of
PETALUMA SKY RANCH
Petaluma, California

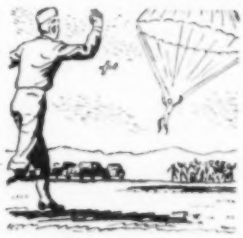
2200' graded runway, lighted on request . . . snack bar . . . fireside lounge . . . free transportation to Petaluma . . . CAA-approved flight school and flight examiner . . . near Valley of the Moon resort area . . . complete *Standard Oil Aviation Service.*

How airports do a big community job

George Justman, of Justman Flying Service at Petaluma, knows from experience how important airports have become to the communities they serve. He tells this story:

Businessmen find airport facilities valuable.

Student Pilots relax in the flight lounge.



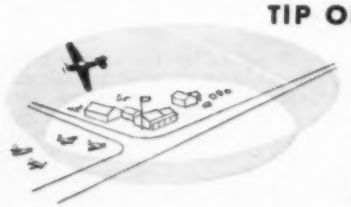
Air Scouts keep pace with our air age.

"Here at Petaluma, we have a true community airport. Along with student pilots and others who fly for pleasure, we have flying farmers, hay and grain buyers, chicken ranchers and other businessmen using our facilities. They've discovered that a community airport helps them to do more business quickly and with enjoyment. And we make sure of dependable performance in the planes they use by servicing them with Standard aviation products. In my 8,000 hours of flying, I've never used any aviation gasoline that gives the consistently high performance of Chevron 80/87 Aviation Gasoline, or any oil that keeps engines as clean as RPM Aviation Oil.

"On Air Scout Day each year, a lot of people from the community come out to see their airport in operation. And many of them are surprised at how important flying has become to a wide variety of businesses. But they are not surprised to find that flyers, too, use 'Chevron' and 'RPM.' On the ground and in the air these two brand names mean quality and dependability wherever you go in the West."

T. M.'S "RPM," "CHEVRON," REG. U.S. PAT. OFF.

TIP OF THE MONTH



Circle all fields before you land (especially airports that are not radio controlled) at least 500 feet above the traffic pattern. Study the landing conditions, and pay attention to signals. It helps prevent accidents, and will save you coming in on a field that is closed or under repair.

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

STANDARD OIL COMPANY OF CALIFORNIA

AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

AOPA GOES TO COURT

An AOPA member was recently successfully defended in a Syracuse, N. Y., Federal Court against charges filed against him by the CAA. The member was Allen W. Hayes (AOPA A9251), Ithaca, N. Y. Attorney John H. Hoffman (AOPA A21498) of Kennett Square, Pa., handled the case for AOPA.

Hayes was charged with violating sections 60.46 and 60.12 of the Civil Air Regulations after making an instrument letdown through a high cloud deck preparatory to landing at the Reading, Pa., airport.

The CAA contended that Hayes made an illegal instrument approach to the airport, because he did not conform to the CAA's specified instrument approach procedure for that field. Hayes contended that he merely requested the Reading control tower's permission to descend through a cloud deck which was well above the minimum altitude specified in that instrument approach procedure. Hayes also contended that, after letting down through the cloud deck with the tower's permission, he proceeded VFR to the Reading airport.

When Hayes first called AOPA's attention to the CAA's charges against him, AOPA studied it as a possible test case. In view of the CAA's contentions in the matter, AOPA finally commissioned Hoffman to handle the case after Hayes had refused a CAA offer to compromise the case for a routine monetary settlement. It was when Hayes insisted on being tried in a Federal court that AOPA appointed Hoffman to the case. Hoffman is the attorney who, several years ago, represented AOPA in a successful court fight in which landowners attempted to close down the small Paoli-Malvern airport in Pennsylvania as a nuisance. Hoffman won that case.

In ruling in favor of Hayes, Federal Judge Stephen W. Brennan of the Syracuse court said the CAA had failed to establish sufficient proof to warrant a finding of violation of the law, rules and regulations. He said that, if there was any violation, he did not see any in the Federal regulations.

CUSTOMS OVERTIME

High overtime charges by Customs inspectors at airports of entry in the United States has long been a sore point with AOPA. Over a period of several years, AOPA members have reported high overtime charges, which Customs officials contend they must charge because of the wording of the present laws governing them.

AOPA has now joined with a number of other civil aviation groups, including the airlines, in backing Senate Bill 354 in Washington, which will put Customs inspectors on the same overtime-pay basis as other Government workers. AOPA is backing the new legislation because of instances like these:

In a recent survey, the U. S. Bureau of the Budget found over 100 Customs inspectors who got more overtime pay than their regular salaries.

One inspector earning between $4,500 and $5,000 per year got an additional $7,000 in one year for overtime.

Another inspector collected overtime pay at a rate of $68 per hour.

Six inspectors at San Antonio, Tex., split between $30,000 and $35,000 annually in overtime pay, although they only handled one international airline flight daily.

WHAT EDICT NEXT?

While AOPA continues to fight the Government's arbitrary mandate forcing the nautical mile on all civil aviation as the sole unit of distance measurement, effective July 1, other similar edicts may shortly be in the offing.

One is a mandatory changeover from the present inches of mercury used in U. S. altimeters to millibars, a unit of measurement used in foreign countries. The secondary arbitrary changeover is expected to be from Fahrenheit to Centigrade. As is the case with the nautical mile, it is expected that civil aviation interests will be ignored by the Government agencies involved.

"To the roof, please."

AOPA is continuing to press the nautical mile matter for two reasons:

1. Because all domestic U. S. civil aviation—including the airlines—agree that the nautical mile is impractical, confusing, expensive and unsafe for domestic civil use.

2. Because of the arbitrary system established by Government agencies concerned with aviation which enables them to officially ignore the almost universal protests of the entire civil aviation industry. AOPA feels that this ever-increasing tendency on the part of the Government is a dangerous threat.

QUICK RESULTS?

AOPA is frequently startled by the response it gets from items it publishes in the AOPA PILOT and Confidential Newsletter.

In a recent Newsletter, a short sentence was published, saying that John H. Geisse (AOPA 60752), father of the crosswind landing gear, was looking for a machine shop in which to have manufactured a new crosswind gear he has developed.

That single sentence drew about 40 inquiries from companies of AOPA members; six of those look like firm deals.

RESORT BOOKLETS

AOPA now is distributing to members, upon request, copies of two new booklets, covering the resort airports of the eastern and western United States. The booklets contain the most up-to-date information on resort airports available in the country.

CAR-RENT SERVICE

AOPA Active members soon will receive free Avis credit cards that will serve for car-rental at Avis establishments throughout the world. With the new cards, AOPA members will be able to rent Avis cars at any Avis station, use them for an indefinite period, and be billed later.

In addition to having a large number of rental stations in cities throughout the world, Avis also maintains rental cars at a large number of airports. Thus AOPA members can park their planes at these airports, and step right into an Avis car. There are Avis stations throughout the U. S., and such places as Hawaii, England, Canada, Jamaica, the Bahamas, Virgin Islands, and Puerto Rico.

Attention:

NAVION OWNERS

"JET COOLING" BY FLETCHER MATERIALLY INCREASES SPEED, POWER AND SERVICE LIFE ON YOUR CONTINENTAL

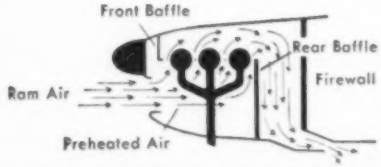
FLETCHER JET COOLING

By reducing cylinder head temperatures up to 150° this Fletcher *jet pump* cooling system will give you new, outstanding performance for your Continental powered Navion.

Jet Cooling is now being used to cool Navions powered with the E-225 series Continental engine; in performance the Navion using this installation will compare favorably with any airplane in its class.

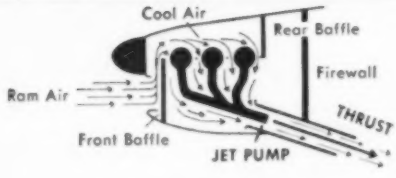
If you are interested in a "**Jet Cooled**" Continental installation for your Navion wire or write Fletcher Aviation Corporation for complete information.

HOW "JET COOLING" WORKS



STANDARD NAVION COOLING

Depends on ram pressures only. Note that the ram air is preheated by exhaust headers before reaching cylinders.



FLETCHER "JET COOLED" INSTALLATION

Uses the exhaust as a **jet pump** to pull the ram air over cylinder barrels and heads, reducing both cooling drag and operating temperatures.

WHAT YOU CAN EXPECT FROM "JET COOLING"

Using 225 H.P.

- a maximum speed at sea level up to 195 m. p. h.
- a cruise speed at sea level up to 175 m. p. h.
- a rate of climb up to 1250 ft/min at gross weight
- increase in range as much as 10% at any given power
- take-off distance reduced as much as 10%

Using 185 or 205 H.P.

- an increase in maximum speed up to 5% may be obtained
- an increase in cruise speed up to 5% may be obtained
- an increase in range up to 10% at any given power

Regardless of H.P. Used

- longer engine life
- reduction in cylinder head temperatures up to 150° at any H.P. output
- reduction in weight
- reduced cooling and parasite drag
- easy accessibility to any part of the power plant.

Fletcher Aviation Corporation

PASADENA | CALIFORNIA

Pulling Wings FLETCHER AVIATION *on the World*

Private Enterprise Scores at Narco

Postwar private flying, long bemoaned as having one foot in an economic grave, is showing some surprising signs of health. Any industry which can spawn and support successful private enterprise is not on its last legs.

Narco (National Aeronautical Corporation) of Ambler, Pa., is a good case in point. Narco was organized in 1945 to produce radio equipment, with emphasis on VHF and omni range navigation aids.

Perhaps the most remarkable thing about Narco's growth and expansion is that it was accomplished without the aid of large military contracts. As a matter of fact, except for one small contract for another radio manufacturer, Narco has never done any military business. They have never done any airline business. They were born of private flying's personal and executive aircraft radio needs and they have thrived on this market.

This does not mean that the government had no hand in helping the new company get a foot in the door. Government aid was provided in the one place where advocates of private enterprise believe it belongs—on development contracts rather than production orders.

Three men are responsible for the organization of Narco. They are Corporation President James Riddle, Vice President and Chief Engineer Rufus Applegarth, and Vice President Rudy Garfield. Riddle was formerly a radio development engineer in the airborne radio division of RCA. Applegarth, an MIT man, was another RCA aviation radio engineer. Garfield was formerly with Stinson's radio department at Consolidated Vultee.

During the difficult years of 1946-47 while other business enterprises were getting out of private flying or steering clear of it, the Narco group decided to devote their full time and talents to an accelerated program of engineering and design. They aimed to produce the first light weight, low cost omni set.

Basically, they were producing a tunable VHF receiver and a crystal controlled VHF transmitter. They had found a ready market, even though ground facilities were lacking.

However, the Civil Aeronautics Administration, riddled by financial cutbacks and restraints, was unable to progress as rapidly as planned with the installation of a complete coast-to-coast, border-to-border omni range network. Budgetary limitations were predicated on the fact that there was no airborne equipment available to use this proposed ground network, even if it were constructed.

Solution for this problem came from a joint civil and military group, the ANDB (Air Navigation and Development Board) which made development funds available to the CAA. In turn the CAA contracted with Narco for the development and manufacture of a limited quantity of light weight, inexpensive airborne omni range receivers. Narco materially aided in turning the tide of the whole omni program by successfully filling this contract within the time and financial allocation. Practically speaking, any aircraft could now utilize the CAA's omni network.

The company is now turning out five types of radio equipment: the Omnigator and Omnihomer for omni range navigation and two-way VHF; a Unicom set which is a two-way VHF ground station for fixed base operators; a low frequency range and broadcast receiver; and an eight-channel VHF transmitter and low frequency receiver.

Narco President James Riddle holds DME station selector and mileage-from-station indicator. Production goal for DME equipment is 1953.

Recently announced is the Superhomer, similar to the Omnihomer but featuring a new method of course selection using a vernier knob for more accuracy and ease of operation.

Distance Measuring Equipment is currently absorbing the design engineering attention of the Narco plant. Operating under another ANDB contract for developing DME, the company reports very satisfying progress. DME equipment will give distance-from-station mileage constantly indicated on a radial dial as the plane progresses to or from the station.

Although other companies also are working on DME, Riddle believes that the Narco formula of developing low cost, light weight radio equipment for the personal and executive aircraft market will continue to be successful.

—*C. L. Hamilton*

I Learned About Flying

(*Continued from page 27*)

It was raining hard now. How could anyone so sweet, so beautiful, do this to me?

I turned to the right, the direction I reckoned Kingman to lie. Nothing was outstanding enough to be spotted on the map. A cloud cover had formed not far above me. Below were the mountains and, somewhere among them, Kingman.

If Kingman lay in the direction I assumed, it would take at least 15 minutes to reach. I was starting to worry. There wasn't gas enough left for floundering around. I decided to continue until five minutes after the time estimated to reach my destination. If still lost, I would turn south and try to intercept the beam which must be Prescott. There was a small field shown on the map. Then again, if this map were obsolete, how could I be sure the field was still there? All sorts of panicky thoughts were running through my mind.

Canyon Country

Visibility straight down was good. I could see the bald mountain tops 1,200 feet below, then clear down into the winding canyons. Not the ideal spot for a forced landing.

At this point, a sputtering left engine made my heart jump. I looked at the gauges. The left coolant temperature was abnormally high and going higher. To the left I could see white coolant streaming from the cowling. Ordinarily this would necessitate feathering, but in my predicament I decided not to feather unless the malfunctioning engine threatened structural failure.

Now, for sure, I would have to turn around and head for Prescott.

Just from force of habit—for I surely didn't expect to encounter any traffic here—I gazed to my left to clear my turn. It was then that I saw the sweetest *Mustang* that has ever been seen. She was cruising a little below my altitude at about eight o'clock. I dropped my nose to pick up speed and racked over as if 10 Messerschmitts were on my tail. Soon we were locked in the tightest echelon you ever did see.

I surmised that ours was a mutual destination. This was confirmed when I called the *Mustang* on the radio. I asked nonchalantly, to conceal my predicament, "How about flying a little formation to the field?"

The *Mustang* agreed but countered with: 'O.K. You lead." Gulp, my heart sank. Maybe this steaming stone was another guy who had blonde dreams and was counting on me to be his homing pigeon. This required tact, since I wasn't ready yet to make any embarrassing admissions. I said in my most flippant manner: "Why switch around? I'll hang on your wing." "Roger," he replied, "we'd better start letting down. Kingman is just over that ridge." God bless him—a pilot who could read.

Kingman Come

As soon as we passed over the ridge indicated, there was beautiful Kingman with her long runways stretching out through the pouring rain in a gorgeous welcome.

On the ground, the first thing I did was to get a current map. The entire runway, Green 4, had been swung south 15° by swinging the outbound leg of the Winslow range to the left. The range station at Kingman was no longer there. Instead, there was one shown for Prescott, operating on the same frequency as the obsolete Kingman radio. Had I not met up with the P-51, I might have been walking yet. Phooey on love in navigation! END

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Delta Wing

(*Continued from page* 11)

CG travel resulting from fuel consumption and load variations, a control surface was devised which, fitted at the trailing edge, proved adequate for all but extreme CG movements.

707B Characteristics

With an all-up weight somewhere between nine and ten thousand pounds and about 51 degrees of sweep on the wing leading edge—as opposed to the 60 degrees sweep of the Convair XF-92A—the Avro 707B took off for the first time at Boscombe Down on September 6, 1950. Practical flight trials which followed gave much more encouraging results than were to be anticipated from wind-tunnel tests, and the orthodox controls proved to be adequate under all conditions, even during landings with a strong crosswind element. It proved to be surprisingly stable as demonstrations, witnessed by the writer, of slow-flying, loops and rolls-off-the-top, and of inverted climbs with negative G., soon proved. No spinning was attempted with the 707B, and this maneuver was not, in fact, considered by the makers as a test requirement. This restriction on spinning will, of course, be of small significance for a medium-heavy bomber such as that for which the 707B was supposedly furnishing data.

The delta, with its low aspect ratio, overcomes the problem of the poor low-speed stability of swept wings through tip-stalling. The Avro 707B had an aspect ratio in the region of 3, and it is a remarkable fact that it flew under adequate control *with the wingtips stalled*—flight photos taken at low speeds showing all the wool tufts on the top surfaces of the wing-tips pointing forward, possibly due to good flow continuation on the undersurfaces.

However, even stalling is not considered as a *normal* test requirement because the attitude of the airplane at the stall is so exaggerated that no pilot would assume it in any way except intentionally. This normal stalling attitude is illustrated by the landing technique adopted with the Avro deltas, the airplane "*sitting up and begging*" at an angle of about 30 degrees. Test pilots have told the writer that this extreme nose-up attitude does not feel or appear out of place and view from the cockpit remains good.

The next step from the Avro 707B was, logically, a refined version with a higher limiting Mach number, and this type, the Model 707A, flew for the first time in July '51. The wing of this model differs in structure from the earlier machines to accommodate intake ducts at the roots. Controls have been changed; ailerons are positioned nearer to the wing-tips, and a new control surface, replacing the inboard elevator portions of the 707B, which is basically a flap to assist trim and dive recovery, but which can be considered alternatively as an auxiliary elevator surface, has been fitted. It is to be presumed that this refined model follows more closely the lines of the reported four-jet bomber than did the Avro 707B.

"Air Defense"

An official Air Force film entitled "Air Defense" has been produced by Warner Pathe News to aid in recruiting civilians for the Ground Observer Corps. Accurately and dramatically portraying Air Defense Command's radar, observation post, filter center and interceptor network, the film is highly recommended for all civilian defense groups. It is a 16 mm reel which runs for 26 minutes. There is no rental fee and copies may be obtained by contacting the Air Force liaison officer at any State Civil Defense Headquarters.

Gloster G.A.5

At the present time, fighters are characterized by high wing loadings, but with the gradual increase of operational altitudes, a new approach to the question of loadings becomes necessary, and the delta fighter may well provide the solution. The first British delta fighter, the Gloster G.A.5, appeared toward the end of last year and, at the time of writing, is completing its initial service trials. Powered by two Armstrong Siddeley Sapphire turbojets, each giving upwards of 7,500 lbs. thrust, mounted at the fuselage sides, the G.A.5 (which may eventually become known as the *Spearhead*) is a tandem two-seater all-weather fighter.

We have mentioned earlier the probable need of a horizontal tail surface placed well aft of the CG by a fighter of delta planform to provide for spin-recovery, and the provision of such a tailplane is a noteworthy feature of the Gloster G.A.5, although it has not been revealed if this tailplane is a *permanent* feature of the airplane or merely a precaution for initial flight testing. Further details of the G.A.5 are shrouded by a security curtain, but it can be said that, at the time of writing, the G.A.5 is competing with the more orthodox twin-boom D.H.110 in comparative trials. Whichever machine is chosen as the future standard all-weather fighter of the R.A.F., it will be accorded *super* production priority, along with the *Hunter* and *Swift* day interceptors and the *Valiant* medium-heavy bomber.

This question of a horizontal tail surface is still very much a theory, for Boulton Paul Limited have been testing their high-speed P.111 delta, which has been frequently associated with a fighter project, since October '50, and this has *yet to sprout a tailplane*. Powered by a 5,000 lb thrust Nene jet, the Boulton Paul P.111, despite its delta planform, possesses a surprisingly low thickness/chord ratio, even at the root, and is extremely fast indeed—nearly, if not actually, supersonic. The wing leading edge has a sweep angle of some 45 degrees and the fuselage is of flattened oval section at the nose intake, deepening aft of the forward-mounted cockpit.

A feature of the P.111's design is the provision of detachable wing and fin tips, and much experimental work has been undertaken to determine the relative merits of various kinds of tips and the effects of "clipping." A faired container at the tail of the 26 foot-length fuselage contains a GQ braking chute.

Fairey FD-1

Climbing down the size scale to the smallest of Britain's current delta research team, we arrive at the Fairey FD-1 which, spanning only 19½ feet and, like the P.111, swept some 45 degrees at the wing leading edge, competes with the Convair XF-92A as the most futuristic, missile-looking of existing deltas. Presently, the FD-1 has completed its initial flight test phases and is undergoing modification, but early tests were undertaken with fixed wing-tip slots, wing-tip parachutes and a temporary horizontal tailplane.

Flown for the first time in March, last year, the FD-1 was designed "for important research work with revolutionary possibilities in the design and operation of fighter aircraft"—generally interpreted to mean that this diminutive airplane is a pro-type for a vertically-launched, rocket-boosted "target-defence" interceptor of the Bachem *Natter* variety. Powered by a 3,500 lb thrust Derwent jet, the FD-1's stubby fuselage terminates in a cluster of fairings, one of which houses a drogue-type chute and the others presumably accommodate booster rockets. Flying controls are in the form of "elevons" and a rudder, but whether the FD-1 will continue to sport a tailplane when it recommences flight testing is anybody's guess.

Thus, delta history boasts only eight powered deltas at the present time (discounting a reported Russian delta); two of which have been built by the U. S. airplane industry, one by the Swedish airplane industry, and five by the British airplane industry. Demonstrations of these deltas have given convincing indications of this planform's practicability.

Summing up, it has been said that to meet the internal capacity, range and performance requirements of the combat airplane of the '60's, the delta provides the only satisfactory solution, for the following reasons: (a) Its features avoid the drag rise near the speed of sound; (b) tests have shown that the delta wing gives minimum changes in stability and control characteristics at near sonic speeds; (c) in spite of the delta wing's thinness, its internal volume is large, so that the jets, fuel tanks, undercarriage and all the necessary equipment for an operational airplane can be housed within the wing envelope; (d) in bomber-type deltas, at least, adequate control can be obtained from wing control surfaces, eliminating the need for a conventional tailplane; (e) auxiliary devices such as slots and flaps are unnecessary, and (f) the delta wing is free from distortion troubles at high speeds and its effects on stability or control power. END

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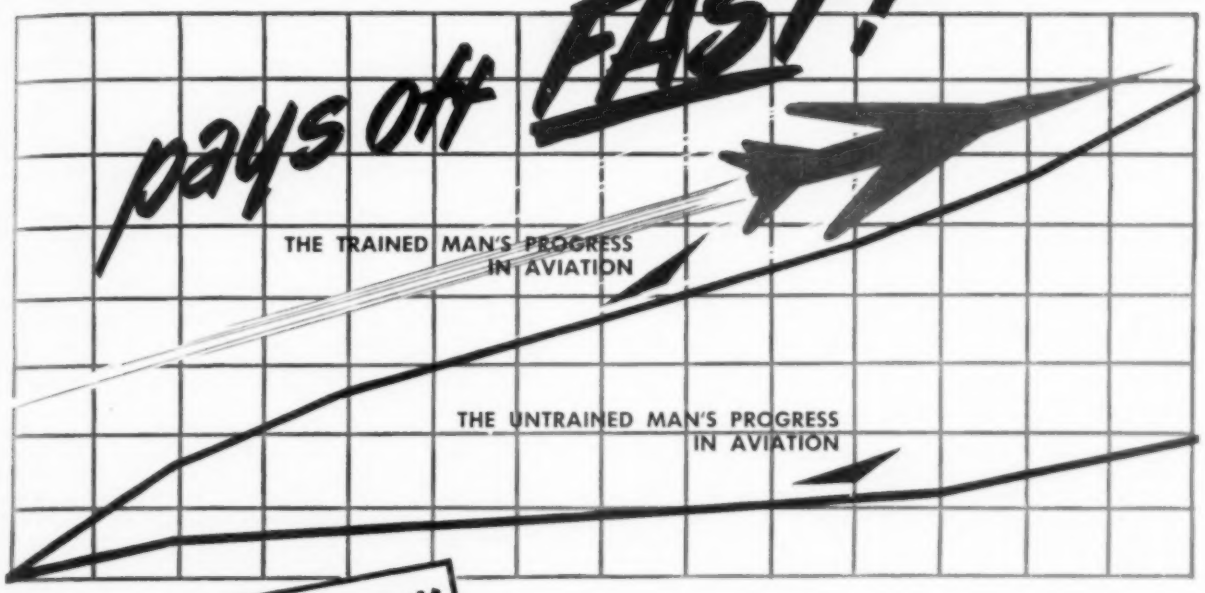

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Floats Can Help

(Continued from page 23)

(measured up on the left-hand line) with the time in seconds (measured down on the right-hand line.) This straight edge will intersect the slanting middle line at a point indicating your ground speed. An examination of the chart will show that the higher you are the more accurate will be the ground speed reading and that it is easier to read the slower ground speeds than the faster speeds.

It is quite probable, of course, that you do not know your exact altitude above the ground or water. If not, this method can be used to determine terrain altitude. Flying straight and level as before, time the number of seconds for passage of a ground object. Then climb 500 feet, level out, and take another timing. Our flying mathematical wizards can take the number of seconds in the first timing, multiply it by 500 and divide by the difference between the two timings, to get their altitude.

Ordinary mortals will use Chart 2 in the same manner as the first chart. Take any straight edge and place it on the chart so as to join the first time in seconds (read upward on the left-hand line) with the difference in seconds between the two times (read downward on the right-hand line). The point where this straight edge intersects the slanting middle line will mark the terrain altitude. This altitude, incidentally, is the altitude you were flying before you climbed the 500 feet. It is not altitude above sea level but is the actual altitude over ground or water. Naturally this system can be used only when flying over water or level ground. It cannot be used over mountains.

If you know neither your altitude nor your ground speed it is possible to get an estimate of your ground speed by the same system of timing an object, climbing 500 feet and timing another object. If you take your mathematics straight, just divide the difference between the two timings into 680 and you will have your ground speed. To save you mental effort, however, the following chart will give the ground speeds corresponding to the various time differences.

Difference in Time	Ground speed
4 sec.	167 mph
5 sec.	134 mph
6 sec.	112 mph
7 sec.	96 mph
8 sec.	84 mph
9 sec.	75 mph
10 sec.	68 mph
11 sec.	61 mph
12 sec.	56 mph
13 sec.	52 mph

If there is a difference of 7 seconds between the two timings at different 500-foot levels, your ground speed is 96 mph. If there is a difference of 8 seconds, your ground speed is 84 mph. This is true regardless of your altitude. Since it is difficult if not impossible to get a timing of more than 1-second accuracy, this chart gives only a rough estimate. However, if you're flying over a large body of water or over land that has no check points or if you are lost and cannot identify check points to get a ground speed reading, even a rough estimate may be important.

If there is a considerable change in wind velocity within the 500-foot altitude you climb, the method loses accuracy, but again there may be a time when an estimate may come in mighty handy.

Even if you are using a computer to determine ground speed, this rapid floatplane method provides a handy means of checking your figures. If the computer method gives a ground speed reading that seems excessively high or excessively low the floatplane method will quickly tell whether the computed speed is reasonable or whether there is an error in your figures.

Those two black marks on your float, together with the attached charts, will provide you with a new and interesting method of ground speed and altitude estimation, that is not available to landplane pilots. END

Day in Court

(Continued from page 17)

business of an airport will not constitute nuisance. It is the unusual, unnecessary and unreasonable operation that creates the condition.

One case well illustrates this principle: Thrasher v. Atlanta, 1934. Clovis Thrasher lived near Candler Field which, he said, constituted a nuisance owing to: 1) imminent danger; 2) noise; 3) low flying; 4) dust.

The court found, as to danger, that "the mere apprehension of injury is not sufficient to authorize an injunction . . . the consequence must be to a reasonable degree certain."

The noise complained of came largely from engines being run up on a test stand, often late at night. The court pointed out that nowhere was it alleged that the noise was excessive or unnecessary in view of the business conducted.

The low flying over Thrasher's land was held not a nuisance in itself, and nowhere was it alleged that there had been any hurt, inconvenience or damage to the plaintiff.

As to the dust, there plaintiff struck pay dirt. Candler Field was mainly graded raw earth. The better the weather, the more flying, the worse the dirt. The court found that since dust is a thing that may in some measure be controlled by vegetation or chemicals, the dust bowl at Candler was the result of improper or negligent operation. An airport, fairly enough, is bound by the same rules of conduct as any individual engaged in any business. In this case Candler Field was made to kick up only a reasonable amount of dust. Gesundheit, your honor.

Negligence

"Let us now peruse the ancient authors, for out of the old fields must come the new corn," said Jurist Edward Coke in 1630. One imagines the old barrister shying testily from a sleek *Navion* and muttering these words today. The law of the air, far from being a "hocus pocus * sort of science," is deeply rooted in the past, the more so as it is new to the present.

A favorite character among ancient authors whenever the tort of negligence cropped up was a prudent prig for whom I, for one, would never buy a drink: the so-called "reasonable man." He is that legal fiction who conducts his affairs ever with care and foresight, and so uses his property as never to injure the rights of another.

Negligence is the failure to do what a reasonable and prudent man would ordinarily have done under the circumstances; or, conversely, doing what an ordinary prudent person would not have done.

Courts have found over the years that the airplane is not inherently a dangerous instrument, although it may become such if it is improperly used. The pilot owes a duty of care to others on the ground, in his plane, or in another plane. If he's not careful, and they're hurt through his negligence, he's liable for damages to any one of them.

What sort of care must a pilot use? Ordinary care such as a reasonable man would use under similar circumstances is the standard, but even ordinary care varies for a pilot. It goes without saying that he will exercise a higher degree of care flying night weather around mountainous Denver than for a CAVU day over pancake-flat Wichita.

The court in Greunke v. North American Airways, 1930, stated the rule in part: "The care used must be commensurate with the dangerous consequences to be reasonably apprehended . . . It is the degree of care that men of reasonable vigilance and foresight ordinarily exercise in the practical conduct of their affairs."

Icarus, Too

Ever since Icarus, aeronauts have unsurprisingly gotten themselves in trouble. Mainly because we're human, and our airplanes are made by humans. That sort of thing has a way of persisting. Just realizing our fallibility will help some of us to stay out of court, because we'll be extra careful.

A brief look at some cases and principles we've had here may remind others of us how to stay out of court, because we'll check the law as we would check the weather—beforehand.

Once in the soup of litigation, never try to go it alone, say the legal aid people. Since the layman who acts as his own attorney has a fool for a client, the only plea open to you would be insanity. Best course is to fling your sobbing self on the bony shoulders of a competent member of the bar and dry your tears while he eyes your wallet and calculates your net worth with embarrassing exactitude.

None of which dubiously sage counsel lightens the foreboding fact that flying man is born to trouble as the sparks—and wings—fly upward. Remember, when Pandora let the world's ills and troubles out of the proscribed box, they didn't just slither out—they *flew* out. END

* A Bowdlerism of *hoc est corpus.*

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They Know the Way

(*Continued from page* 13)

Kozmetsky, a University of Washington junior who that summer was taking advanced Reserve Officers Training at Vancouver barracks, spoke Russian.

"Sdractrach," he sounded out for hello. Immediately the bewildered fliers warmed up, especially when they learned they were at a U. S. army barracks. By chance, George C. Marshall, who five years later was to have much to do with our Russian allies, was commandant at Vancouver at that time. General Marshall, then a brigadier, invited the Russian trio to his home, with young Kozmetsky as interpreter.

General Marshall learned that the long flight over the North Pole, made mostly at 4,000 feet, was without incident except for some ice forming. The fliers' only food had been hot tea from a thermos jug and lemons which they sucked. Their drinking water had frozen, so they had to suck ice. They had smoked "hundreds" of long thin Soviet cigarettes and their mouths felt "full of cotton."

The only clothes the fliers had were their flying suits. Over silk pajama-like underwear, they wore pants, heavy pullover sweaters, soft leather puttees and heavy Eskimo mukluks. They wore no military insignia.

The general's hospitality included an offer of whiskey, but the Russians preferred cognac. After a little scurrying around the base, several bottles were produced. The men then cleaned up a bit, using the General's razor, ate a hearty breakfast of bacon and eggs, and went to bed.

By this time, Vancouver barracks, and the general's house in particular, were being mobbed. Vancouver is only across the Columbia River from Portland, and thousands flocked to see the plane, jamming the interstate bridge. Newspaper reporters, who had figured the Russians might land at Portland's Swan Island airport, rushed to Vancouver.

General Marshall would not allow his guests' sleep to be disturbed but he permitted his study to be turned into a press room. There, through the afternoon hours, reporters fussed and fumed but had to wait nevertheless. London newspapers called for interviews with the fliers and were turned down. A message of congratulations came from Premier Josef Stalin. President Roosevelt and Secretary of State Hull sent their best wishes.

Crowds Visit Plane

The monoplane, which the Russians designated as the ND-25, was roped off and guarded by soldiers who kept back the thousands of visitors. Under the plane's right wing were the letters "URSS," while the left wing bore "25ND25." The wings were red and the fuselage gray. Double wheels featured a retractable landing gear.

The wing spread on the plane was 150 feet, and the length 45 feet. Wings were covered with fabric but the fuselage was of metal. A map on the tail of the plane read "Mockba," for Moscow.

By comparison with present multi-engine planes, the ND-25 now seems crude and slow with its 12-cylinder V-type engine averaging a little over 85 miles an hour. The plane had a "homing" compass, with which the pilot could fix directional reception on a transmitter of his choosing. The dual-controlled plane was a three-place job, with no room for standing.

Before the three fliers were bedded down for their first sleep in nearly three days, Harry K. Coffey, Oregon governor for the National Aeronautic Association, and others received the plane's barographs. Pilot Chkalov cut one finger severely as he removed one of the aluminum-covered barographs, which were about the size of a Pullman loaf of bread, from the plane's wing. It was smeared with blood as he handed it to board members.

Through an interpreter, Chkalov asked: "Please do everything possible to make our records complete and official."

While the Russians previously had announced they were seeking no records, it was obvious they were taking no chances since the plane carried three barographs. To set a record, the plane could make no intermediate stops. The sealed barographs would reveal any such stops. The sealed gasoline tank precluded any possible refueling in the air. When the gas tank was checked it still contained 750 of the original 1,900 gallons.

Fliers Outfitted

Later that Sunday afternoon the fliers were awakened by Ambassador Troyanovosky, who flew up from San Francisco. By this time, General Marshall had arranged with a Portland department store to outfit the fliers and what amounted to a haberdashery shop was set up in an anteroom in the general's home. The store sent over 23 suits, 23 pairs of shoes and three dozen shirts for the fliers to choose from. Luckily, the store's tailor shop foreman, Sam Campf, spoke Russian. Not until they were fully dressed would the fliers pose for deadline-harried newspaper photographers. By then it was nearly 5 P.M.

The next day, on orders from General Marshall, the three heroes were given full military treatment. At noon they received a 19-gun salute. Ambassador Troyanovosky was presented with a sword as official recognition of the flight. The entire garrison paraded in review. A reception in the officers' club followed.

Round of Receptions

This same Monday noon, the Portland Chamber of Commerce hastily arranged a luncheon in honor of the fliers. They were driven through city streets, crowded with cheering people. A band played for the luncheon. The red carpet was really out. That afternoon they left by commercial airliner for San Francisco, then for New York and more feting.

The sturdy monoplane was partly dismantled at Vancouver, crated and, on August 7, shipped back to Russia by water. Two years later, in 1939, the Russians shipped the plane back to New York City for exhibition at the World's Fair.

Pilot Chkalov, Co-Pilot Baidukov and Navigator Beliakov sailed for home from New York. A little more than a year later, on December 15, 1938, Pilot Chkalov was killed in testing a plane. He was given a state funeral, attended by Premier Stalin and other high Soviet officials.

It was a difficult, hazardous flight the Russians made over the North Pole to the West Coast of the United States 15 years ago this June. Those still were days of pioneering and the Russians would not admit defeat, even though this first flight failed to set a distance record.

Further Attempts

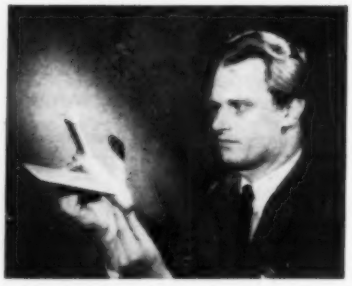
In less than a month, on July 12, 1937, three Russians, Mikhail Gromoff, Andrey Umasheff and Sergei Danilin, left Moscow in a single-engine plane. They landed in a cow pasture near San Jacinto, Calif.—6,262 miles, and 62 hours and two minutes, later.

A third attempt that summer failed. Soviet Pilot Sigismund Levanevsky and four companions left Moscow on August 12, 1937, in a four-engine plane, planning to stop at Fairbanks. They never reached the Alaskan city and they never have been found.

Credit for the first flight over the North Pole still goes to Americans. On May 9, 1926, then Lt. Comdr. Richard E. Byrd, USN, and Floyd Bennett, in a triple-engine Fokker monoplane named the "Josephine Ford," flew roundtrip, non-stop from Spitzbergen, Norway. They made the 1,545 miles in 15 hours and 30 minutes. It was the single engine in the ND-25 that gave Russia her right to a polar "first."

Aviation's progress in the past 15 years has many measuring sticks. Perhaps one is the fact that planes now are capable of flying round trip from Moscow to San Francisco, and non-stop, too. END

German Engineer Heads New Design at Martin



Hans Multhopp, former chief aerodynamacist at the Focke-Wulf aircraft factory in Germany, now heads the engineering division of the new design section at the Glenn L. Martin Co. in Baltimore.

While with Focke-Wulf he designed in 1944 the TA-183, which many experts regard as the forerunner of the Russian MIG-15 jet fighter. Multhopp is shown here with a scale model of the TA-183.

Curtiss-Wright's Dove

A very neat package is Curtiss-Wright Corporation's D.H. 104-2A *Dove*. An executive craft, it is based at the Caldwell-Wright Field in New Jersey and has been in operation since August, 1951. Lear equipped, it has Autopilot, ADF, VHF, Omni and ILS. All radio and navigational equipment is installed in duplicate. The plane carries six passengers and is piloted by Charles Tubbs, with Robert Pirog as the flight mechanic.

Shown at the left is the instrument panel of the plane with its complete groups of airplane and engine instruments, flight, radio, and navigational aids.

Below is the nose section of the Curtiss-Wright *Dove* which houses the radio and navigational equipment. On the left is the dual ADF, on the right the VHF Omnipacks and in front is the ILS. Radio panel is in the back of the compartment.

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Women's Air Race

(*Continued from page* 31)

one fair flier's flight time. From then on, time clocks.

The 1952 race will follow a southern route out of Santa Ana. Designated stops are at Blythe, Phoenix, Tucson, Columbus, El Paso, Odessa, Abilene, Oklahoma City, Springfield, Mo., St. Louis, Terre Haute, Vandalia, O., Wheeling, Harrisburg, and on to Teterboro.

Abilene, Texas, is the only point at which every TAR contestant must touch down. This guarantees that all of the ships will follow the southerly route, and that none of the more powerful planes will hightail it straight over the mountains.

No elapsed time is charged against the entrants for the time they spend at "designated" stops, so it is here that they spend the nights. Naturally, a plane may put in at any airport for rest or repairs, but any time so spent on the ground is figured into the elapsed time and is naturally shunned.

Social Sequel

Waiting at Teterboro to judge the final results of the 2,355 mile race will be Teddy Kenyon of Long Island and Alice Jean Starr and Kay Brick of New Jersey. Then the New York-New Jersey Section of the Ninety-Nines will go into action as host to the contestants and a round of parties and banquets will ensue.

The wardrobe problem enters the picture here, and it's one to which the girls give no little consideration. Mostly, they ship ahead the clothes they'll need at their destination and carry with them in their planes nothing more than a toothbrush.

Last year two chic entrants from Texas, Ruth Deerman and Ruby Hays, made themselves a complete wardrobe of matching frocks and sent them on ahead to Detroit, the terminus for the 1951 race. The girls arrived in the Motor City right on schedule, but their clothes had unaccountably strayed. Regretfully, Ruth and Ruby excused themselves from the social functions and flew back home to El Paso, still wearing the dresses in which they'd left home several days earlier.

Clothes Conscious

This year, as in all recent races, all the contestants will be wearing dresses or suits—no slacks or shorts permitted, by official decree. This regulation stems from the same desire for serious recognition that has led the TAR participants to shun the title of "Powder Puff Derby" which was originally applied to their big race.

The TAR, as it is flown today, aims to demonstrate the utility, safety and reliability of light aircraft and the efficiency of women pilots, as well as to provide a competitive and enjoyable activity for all women who fly.

Since its start in 1947, the TAR has mushroomed in prestige and in public

Mardo Crane, ex-Wasp, commercial pilot, and general chairman of 1952's Sixth Annual TAR, checks the race route with Robert Taylor, who will be official starter of the TAR at Santa Ana, Calif., on July 4.

recognition. Diana Bixby of California is hailed as the founder of the race for it was she who suggested in 1947 that a transcontinental race precede the opening of the Women's Air Show at Tampa, Fla.

The idea was taken up with enthusiasm and several planes were entered, but when the day arrived for the start of the race a lone Ercoupe was the only entrant to show up at the starting line in Palm Springs, Calif. Caroline West and Beatrice Medes, both Californians, sportingly raced against their own advertised cruising speed and were welcomed in Tampa with trophies, cash, and considerable applause.

$1,500 Lure

By 1948 the idea of a race was well planted, and Jacqueline Cochran put up a $1,500 purse as the prize. That year the race was named in her honor, and six planes made the trip from Palm Springs to Miami. Frances Nolde of Pennsylvania came in first in a *Navion*, followed by Helen Greinke of Illinois in a Cessna 120 and Dorothy Krovoza of California in a Bellanca.

The 1949 race brought several innovations, in addition to the unfeeling time clocks. Ten days before the start of the race, Mardo Crane and Esther Nelson took off from San Diego to fly a preview of the entire cross-country flight. At each designated stop they checked with the tower, the local Ninety-Nines chapter and the press to be sure that all was in order for the coming event. They earned the name of "Trail Blazers," and established a precedent that has been followed each succeeding year.

Seventeen planes, with 27 women aboard, took part in the 1949 contest, San Diego to Miami. Loretta Foy and Sue Kindred came in first in a Piper *Clipper;* Betty Gillies and Barbara London were second in a *Navion*, and Dee Thurmond placed third in a Cessna 140. All the winners were from California.

The Ninety-Nines officially adopted the TAR as their project in 1950, when 33 planes and 51 pilots flew the course between San Diego and Greenville, S. C. At the urging of Lt. Gen. Harold L. George, the town of Odessa, Texas, became overall sponsor of the race and put up the $1,500 purse. At the banquet in Greenville, with James F. Byrnes as the speaker, first prize went to Jean Parker, who had flown a Taylorcraft; second prize to Betty Lambert and Clare Hale in a Cessna 120, and third prize to Aileen Pickering and Irma Story in a Cessna *Patroller*. Once again all the winners were Californians.

Reputation to Uphold

The TAR grew to new proportions last year when 44 planes and 77 women were entered in the race from Santa Ana to Detroit. Attorney Bertrand Rhine came into the picture as legal adviser to the Ninety-Nines and suggested the incorporation of the race and the selection of trustees. Regretfully he advised that a Nevada gambling house, which was offering to provide full sponsorship of the TAR, be turned down as not quite measuring up to the dignity of the occasion.

The trophies last year were offered by Olive Ann Beech of Beechcraft and by Cessna, Ryan and Taylorcraft in that order. Claire McMillen Walters and Frances Bera came in first in a Cessna 140; the Dietrich twins, Marion and Jan, placed second in a Cessna 120, and Edna Gardner Whyte was third in a Cessna 140.

The results of that race confirmed the suspicion that the Cessna people were being on the modest side in making claims for the performance of their aircraft, since up to that time all handicaps were figured on the basis of the performance figures published by the various manufacturers. Or maybe the other plane makers were overly optimistic in their promises. In any case, the results were somewhat lopsided and, to even things up in the 1952 race, a team of Douglas engineers have come up with a new handicap table, carefully tabulated on the basis of known performance records.

On all counts, the '52 race is expected to be the best ever. Trail Blazer Anne Rambo will take off from Santa Ana about May 25. From then until 5 p.m. EST, July 9, it will be TAR time again. END

They Fly for Fun

(*Continued from page* 18)

There are two reasons why we logged more than 1,200 hours in the air during our first year of operation: 1) all flying by club members is done in strict accordance with CAA, state, local, airport and club rules; 2) members take turns performing maintenance on our aircraft and work at least five hours each per month in order to be eligible to fly.

A source of particular pride to the club is its five-passenger Waco cabin plane which members are permitted to use for vacation trips. When Warrant Officer William H. Leger recently took his annual leave, he trundled the light plane out of the hangar, loaded his wife and two children aboard and took off on a cross-country vacation trip with stops in New York, Pennsylvania, Washington, D. C., North Carolina, Oklahoma, and back to Omaha. His only expense was for gas and oil. END

LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

ON HY

Every once in a while people will ask me what my for-short name stands for. I sign it "Hy," and I answer, "Hiram." Some of them come back with, "Why, I thought it was short for hybrid." (Anyway, a hybrid is a sport, the dictionary says.)

"Why don't you use 'Hi'?" they ask me. So many ask me that I suppose some of you, gentle readers, have mildly wondered. So I am going to give you the inside dope and settle this thing.

I used to sign my name "Hi Sheridan." Strangers would call up the house and ask for Hee Sheridan. Pretty soon some doggone wit was sure to call me Hee Hee Sheridan, a heck of a thing for a humorist. It might stick.

Anyway, to add a little folklore, I used to live in LaCrosse, Wisc., near a fellow named Loew, and when we would pass each other he would hail: "'Lo, Hi." And I would reply: "Hi, Loew."

This piece ought to settle something.

* * *

CAN YOU BEAT IT?

Sadie the Stewardess was in the lounge of a Dizzy Six reading the headlines in a newspaper, and she took in: "Prisoner Escapes by Ruse."

"That's happening all the time," she said. "I just don't think they should leave those ruses lying around where the prisoners can get at them."

* * *

ALTIMETERS AND SUCH

You know what the Kollsman altimeter said to the static tube? "Don't push me, kid, I'm sensitive."

You know, the airliners have two altimeters. How to set the two is a matter of opinion and all of the opinions are not quite alike. The thing is something of a problem, too. The indicator dial is designed in such a manner that the altitude can be easily misread, yet the airliners make blind approaches (not to speak of flight in mountains) depending absolutely upon the accuracy of the reading.

Some pilots handle their altimeters in the following manner. When in flight, not landing, both altimeters are set to sea level pressure so that the instruments read how high the airplane is above sea level. Say it is a landing to be made by the first officer. When "in range" he sets his altimeter to the field pressure, showing how high the airplane is above the field. The captain's remains on sea level.

With some crews it is not done that way. When "in range" both altimeters are set to field pressure. Their argument runs like this. If the first officer is making a blind approach, the captain monitors the instruments on his own side, something he has to do for safety's sake.

There are a lot of instruments that have to be watched closely, especially the ILS blind approach instrument, so the captain does not like the strain of keeping his left eye on his instruments and his right eye cocked over staring at the altimeter several feet away on the first officer's board.

For years one of the large airlines has required its pilots to have the right hand altimeter always set to sea level and the left hand one to field pressure. The officials argued that however awkward it might be, it was standard and the pilots would never get mixed up momentarily.

Now this airline has come out with a change. The right hand altimeter is always to be set to sea level. In cruising, the left altimeter is to be set to sea level, too. When in range of a field, the left instrument is set to field level.

There is only one trouble with this kind of thing, outside of the general confusion. If either the captain or first officer is coming in and letting down blind, the first officer has to look across at the captain's altimeter while keeping his other eye on his ILS Needle Flopper and his Airspeed and his Gyrosyn Compass, etc. If either pilot is making the letdown, he must remember whether or not he has reset the left altimeter to the field pressure. If he has not, he may level out, at Chicago, for example, 600 feet under the ground, which will be disappointing to him.

The altimeters we have now are deceiving enough by nature. Have you ever looked at the bland face of a specimen of the opposite sex and wondered what she was thinking? You can look at the Sensitive Altimeter face and sometimes you wonder what it is thinking, too. They have five pointers for one thing, or for five things, rather.

Be mighty careful, kiddies, with them altimeters. Be sure to set them right and remember which is which. When you set them, don't let anything distract you, such as the babble of the radio instructions.

Don't let your altimeter get you down! (Ain't English grand?)

* * *

EPITAPH

He forgot to watch his engines
On the high-stress take-off run
And an engine caught on fire
And then the wing caught too,
And our intrepid flier
Was done—well done.

Captain P. V. H. Weems, U. S. Navy, Retired, founder of Weems System of Navigation, author, internationally known consultant on air and sea navigation.

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U. S. AIR FORCES, MAJOR AIR LINES AND FRIENDLY GOVERNMENTS use many of my navigation aids and instruments as standard equipment. Of these, navigation "musts" for pilot and student alike are the Weems Mark II Aircraft Plotter, the Dalton E-6B, or Mark VII Computer. A few of my navigation aids and instruments are described below. Many others are described in my FREE 26-page catalog. Write for your copy today. Address Dept. 5.

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WING TALK

Flood Fight

Once again Civil Air Patrol faced a grim Missouri River flood, somewhat after the fashion of last year's July rampages in the Kansas City area. This time the Mo did its stuff earlier and farther upstream, where frozen ground aided the flooding waters when the river went out of its banks at Pierre, S. D., and down all the way to Omaha and Council Bluffs.

While Pierre and Sioux Falls, S. D., took the early flashes of the flood, the low areas of Omaha and Council Bluffs were contested by millions of sand bags and thousands of workers in one of the most outstanding demonstrations of stamina witnessed in the midwest. Here, CAP and the Red Cross joined hands in every phase of the emergency. Col. Rudy Mueller, wing commander of CAP-Nebraska, told of ARC workers accompanying CAP walkie-talkie operators in quest of those in need of food or relief from duty . . . CAP also flew Red Cross officials and others on aerial recon of the area . . . A constant parade of Nebraska and Iowa CAPlanes patrolled the levees and sand bagged areas in search of leaks that would threaten the low areas.

Vast sections of Omaha and Council Bluffs appeared to those who could get through guards and those who flew overhead as ghost cities. Not a car or person stirred. Gas stations were not only vacated but weighted down with sand bags to keep the submerged fuel tanks from popping through the ground in case of flood in the actual downtown area. Only CAP, police and cab radio personnel were in sight as the river flowed by at a level higher than these radio watchers.

Four times, while thousands of men put in sand bags along the top of the dikes, CAP airborne and surface radio were credited with saving the operation when leaks occurred and were promptly reported. The Nebraskans flew from South Omaha airport, while the Iowans, as represented by the Oakland squadron, flew out of Council Bluffs airport. An observer from National Headquarters saw the breakout at Hamburg, Ia., and was told that CAP of both wings was prepared to follow the flood as far south as the emergency demanded. Throughout the operation, CAP was credited in three states with aiding immeasurably in the safe evacuation of thousands. Meanwhile, no operational accidents occurred to CAP planes or equipment.

On the Mississippi side an equally difficult Mississippi gave at least five states and CAP wings a run for the money. Starting in the Twin Cities of Minnesota, and Winona and La Crosse (Wis.), CAP was called in early and remained with the emergency. Iowa wing personnel, including Col. Harold McKinney, wing commander, and Maj. James McKowan's USAF-CAP liaison staff, divided their time between the Missouri and the Mississippi. At Rock Island and Moline, Ill., CAP units under Lt. Col. Anthony J. Carmen worked closely with U. S. Engineers and the ARC. On one call 2,500 pounds of flares were flown to the area from East St. Louis.

* * *

Big Day In D. C.

Several wings appeared for the Congressional Dinner and meeting of the National Board in May still weary from the flood. Although Civil Air Patrol celebrated its tenth anniversary last December with national Civil Air Patrol Week, the report to Congress, delivered by Maj. Gen. Lucas V. Bea[illegible] Congressional Dinner held at Washingto[illegible]s Shoreham Hotel served as a means for somewhat grandly showing off CAP to the Nation.

Among notables present to honor the Patrol were the President and the majority of the 82nd Congress. The Report highlighted 1951 as a year of expansion and operational efficiency. The report was received by a delegation who gave CAPatrol "just praise." Signal honors went to Cadet George R. Robertson, of Newnan, Ga., who spoke before the assembly on "what being a CAP cadet has meant to me." He got a huge hand from the distinguished audience. Fifty-one other cadets attended with their wing commanders as special guests.

* * *

A unique acquisition for the Scottsbluff (Neb.) squadron was the 51-foot tower donated by Hayes Center. Destined for indeterminate CAP duty, the catch was that the former beacon had to be dismantled and transported to Scottsbluff. It was.

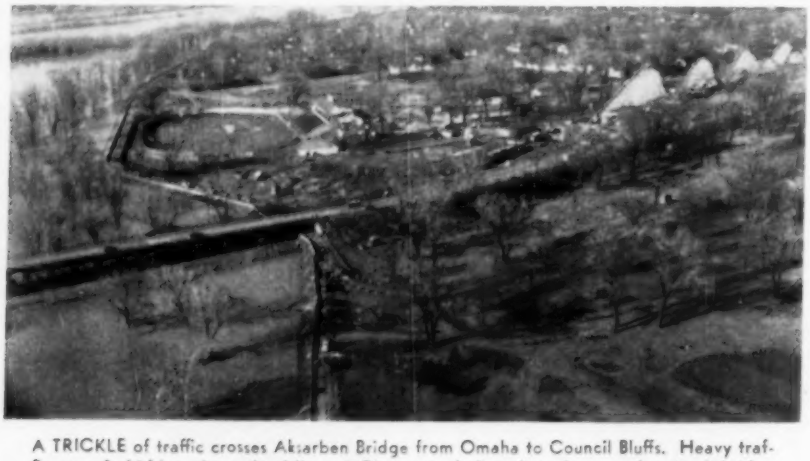
* * *

The on-loan aircraft program of CAP is getting a shot in the arm this summer with a plan for distributing some 200 Aeronca L-16s to wings for official use. The L-16s will supplement rather than take the place of older L-4s and L-5s, which have done excellent service in CAP's official flying program. Much study at National Headquarters has resulted in what is believed to be an equitable distribution of the new airplanes.

* * *

A pre-CAP cadet organization in Bucyrus, Ohio, is known as the Rockets. When the Rockets turn 15 they can become cadets and it is felt that this training will result in better cadets who take a three-year course.

"And when you leave . . ." [illegible]te Co., Manchester, Conn., w[illegible] o a CAP tour. Here Dorothy [illegible]neer adjusts a 'chute for CA[illegible]arlet Larkham of Willimantic, [illegible]blues.



A TRICKLE of traffic crosses Akiarben Bridge from Omaha to Council Bluffs. Heavy traffic was forbidden since the Missouri River was believed to have undermined bridge underpinnings. From this CAP plane, and others in an endless stream from dawn to dusk, the pilot was able to detect first signs of leaks in dikes and levees, or sand boils from river pressure. Note roller coaster and race track of Playland Park. The Missouri is nearly a mile to the left of this "shore."

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The Trend Is "Tourist"

(*Continued from page* 26)

Belgian airline, combines first class and tourist service in the same aircraft, with 40 tourist passengers occupying the forward cabin and 16 first-class passengers seated in the tail section.

Curtailment of leg room and elimination of berths are principal items distinguishing tourist from first-class service. Plane capacities range from 40 in the *North Star* to 82 in Pan American's DC-6B's. All tourist planes provide reclining seats, frequently arranged in rows of three and two across, instead of the usual two and two.

Food service at a nominal extra charge, in place of the traditional complimentary, full-course meals, is another innnovation that makes tourist service economically feasible for the airlines. All the transatlantic airlines are serving hot meals to their tourist passengers, though in some cases the meals are served only on the ground at stops en route. Meal prices range from $1.25 for a single meal to a flat $4 for all in-flight meals. In general, tourist passengers are requested to indicate in advance of the flight whether or not they plan to buy one or more meals aloft, but to date there have been no reports of any passenger being refused a meal because he lacked a prior reservation.

Picnic Style

Tourist passengers are invited to carry their own box lunches, if they prefer to do so and can still remain within the baggage allowance. Tea, coffee and chewing gum are served free of charge, but under the terms of an inter-airline agreement no liquor of any kind may be sold or served on tourist flights. Interestingly enough, this particular prohibition is a matter of aircraft weight rather than a desire to promote abstemiousness.

The weight problem accounts also for the other major tourist restriction. The free baggage allowance, which is 66 pounds per passenger on a first-class flight, is limited to 43 pounds for tourist passengers.

There you have the basic essentials of the tourist idea—more seats, a moderate meal charge, and less baggage. That's not much to sacrifice in exchange for the $125 saved on a one-way transatlantic flight, the $225 saved on a roundtrip "on season" (April through October), or the $193 saved on a roundtrip in the "off season," when fares are further reduced both for tourist and first-class travel.

Typical roundtrip tourist fares in effect now and through October are: New York-London, $486; Boston-Paris, $513; New York-Rome, $643; New York-Helsinki, $666; New York-Frankfurt, $563.60.

Popular Packages

Travel agents, in conjunction with the airlines, have mapped out some attractive, all-inclusive "package tours" based on the tourist fares. These tours may be of any length, but the most popular are the "quickie" tours, tailor-made for vacationers with only two or three weeks to spend abroad.

A sample package tour designed for the traveler who gets only "two weeks with pay" is a two-week excursion to England and France. Five full days in England, with emphasis on London and the Shakespeare County, and five days in and around Paris, are on this itinerary. The all-expense rate is $656.

A 17-day package tour of Italy, France and England, priced at $844.45, takes in Rome, Florence, Genoa, the Italian and French Rivieras, Paris and London.

How has the public reacted to the bargain rates? To say that the response is tremendous is pale understatement. A month before the first tourist flight, May and June were solidly booked eastward, and the chance of getting a return booking before mid-September (except on a roundtrip reservation) had already dwindled to nothing. The airlines have added more and more flights, to the limit of their equipment.

Pan American and TWA have each scheduled 12 tourist roundtrips weekly throughout the summer and early fall; BOAC flies six flights weekly from New York and two from Montreal; Air France and SAS each offer daily tourist flights from New York, and TCA has a daily tourist flight out of Montreal; Sabena will have six flights weekly by July 1. KLM has four weekly, Swissair and El Al each two weekly, and LAI, one flight each week.

A limited number of seats are still available later in the summer, but it is almost certain that every seat will be filled by the time any tourist plane takes off. For tens of thousands of lucky tourists, 1952 is "the year." END

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5N7

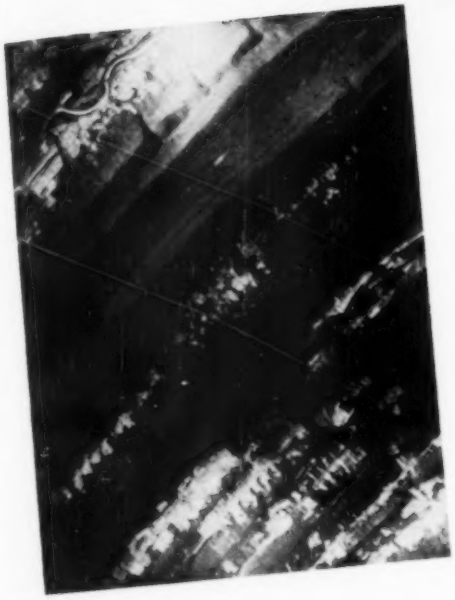
1. These gently rolling hills with their good thermals and fine ridges have made this city's name synonymous with gliding and soaring.

WHERE AM I?

One of the rewards of flying is an intimate knowledge of the face of our country. In successive issues of FLYING we will carry aerial views of landscapes with distinguishing markings. It's up to you to figure out the location. If you remember them all you will eventually have a pretty good idea of America.

SEE PAGE 60 FOR ANSWERS

2. As ruggedly named as it looks, this very low valley is only some 40 miles from the highest point in the United States.



3. Boeing bombers and transports call this west coast city home.

4. Seldom seen from such a height —40,000 feet—these ridges unfortunately are also seldom seen in such clear weather.

5. Hundreds of airmen fly an annual pilgrimage to this vacation Mecca.

SEE

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Aileron Angles

(*Continued from page 28*)

and a wing drops, use opposite rudder to pick up the wing whether you're going to go around again or continue dribbling down the field.

For the average flyer, ailerons are mainly used in connection with turns. There are two types of ailerons in general use today—Frise and differential. The latter type are best explained by the fact that with stick movements the raised aileron moves as far up as the opposite aileron moves down. Frise ailerons are a refinement of the differential type, in that the aileron being depressed into the airflow does not move as far as the aileron raised, and thereby aileron drag is minimized, although not completely eliminated.

On the conventional airplane it still takes rudder with aileron to make a smooth turn. Just how much rudder is needed to enter or recover smoothly depends on the ailerons. A small amount of rudder is always required to overcome the initial aileron drag.

Rudder Needs Vary

Some airplanes are referred to as "rudder planes," and require more rudder pressure than aileron force to enter and recover from a smooth turn. Other types take comparatively light rudder force in relation to the ailerons.

Since the ailerons are outside the propeller slip stream they are unaffected by it. In flight, aileron effectiveness is dependent upon forward speed. As the air speed is increased, aileron controls become heavier and more potent. At low speeds, aileron movements feel mushy and light. Thus, the hinged wing sections are an excellent guide to air speed, from the stall to vibrations felt before entering compressibility. The next time you are embarrassingly aloft with a perverse pitot tube, feel out the ailerons as an air speed indicator.

The advent of brakes (or water rudders on flying boats) has practically eliminated the need for aileron assistance in taxiing. That assistance is nonetheless still there if you want or need to use it. Like ice in anteprandial liquids, you can take it or leave it alone!

Stick Basics

While taxiing in a strong cross-wind, for example, if the stick is moved to the left, the right aileron being depressed increases the effective area which that wingtip offers to the wind blowing from behind and so helps turn the airplane to the left. Moving the stick to the right assists in turning to the right. The reverse of this principle works equally well when taxiing into a strong wind—right stick helps turn a plane to the left and vice versa.

A test pilot friend has some further good advice regarding wing-tip control surfaces:

"Before flying any airplane that has just been repaired or overhauled, it's a grand life-saving idea to wave the stick to the left and watch the left aileron. It should come right up waving back. If it doesn't, it may not be properly connected. Try the right one, too."

Those of the flyer's fraternity who venture into the blue lacking in learning about laterals may not be fortunate enough to write up their experiences in accident statements. Only lucky living pilots advise of their adversities. Statistics are eternally silent. END

AA VICE PRESIDENT HEADS WINGS CLUB

O. M. Mosier

O. M. "Red" Mosier, vice president of American Airlines, is the newly elected president of the Wings Club in New York City.

Born in Oklahoma and educated at the University of Texas, Mosier joined the U. S. Air Corps in 1917. Two years later he was promoted to officer in charge of flying at Rockwell Field, San Diego, Calif.

He left the Army in 1919 but his love of flying persisted and he turned to test and exhibition flying in the mid-west.

There followed a spell in Washington, where he served as secretary to Senator J. W. Harreld, then Mosier returned to Oklahoma and a series of jobs as test flier, trainer of polo ponies and football coach.

In the late '20's Mosier organized three aircraft companies in Colorado and was president of all three. From 1933-37 he was city manager of Oklahoma City, a post he left in order to return to aviation as vice president and general manager of Braniff Airways.

Mosier became vice president of American Airlines in 1938. At present his offices are at LaGuardia Field, where he directs and coordinates the operations, maintenance, supply and engineering departments.

One of the honors Mosier prizes most is his membership in the Navy Air Corps' "High Hat Squadron," an honorary title given only to him and to Charles A. Lindbergh. Mosier's membership was granted following a Colorado snow storm in which he went aloft, located the squadron which was lost while flying in the Rockies, and led them to safety.

Tandem Helicopter

(*Continued from page 19*)

ly in maneuvers. Its notably high moment of inertia in yaw makes its low directional stability an acute problem.

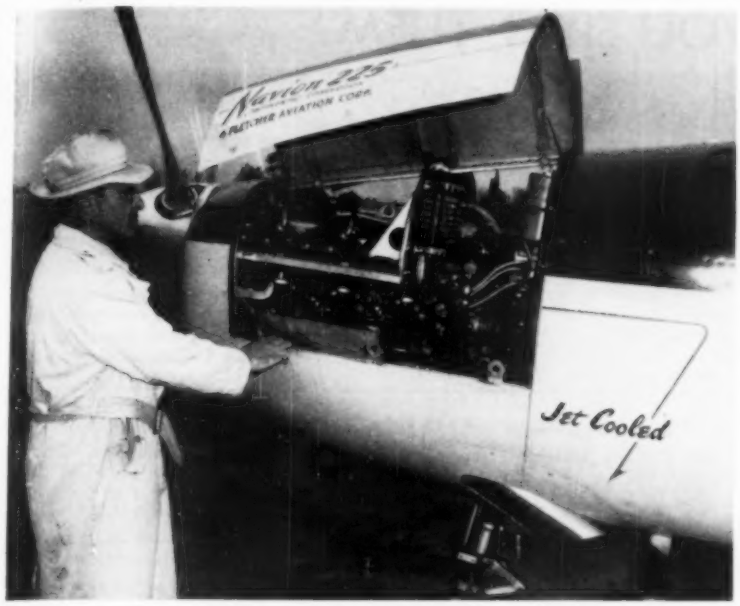
In this respect, stability has been found to increase with power and to decrease with reduction of power. Thus, although added power reduces longitudinal stability, it improves directional stability.

Wind tunnel tests of a fuselage model (Langley Field has 17 different wind tunnels) gave the researchers a lead which has proven valuable. Directional stability of the fuselage itself can be appreciably increased by adding spoiler strips to the nose of the fuselage. These spoilers, a horse collar arrangement of strip metal four inches wide around the forward end of the cabin, project sufficiently into the airstream to create turbulence rather than smooth flow of air along the sides of the fuselage. Since unstreamlined fuselages are known to be more stable than streamlined ones, the desired effect was attained, although it is certainly at the expense of increased drag. It is not suggested as a practical modification but merely one useful for experiment.

Commenting on the tandem type tests, Mr. Gough has observed, "We will definitely show whether the military standards for flying qualities can properly be applied to a helicopter with two rotors. Present standards, which specify certain limits for acceptance performance in helicopter response to controls, were based primarily on single rotor machines. If the standards cannot be applied to the tandem machine we will recommend new or modified standards."

NACA, starting its rotary wing research with the autogyro, has 20 years continuous experience behind it in this specialization. The Flight Research Division at Langley is not the only group so engaged. Presently the full-scale wind tunnel devotes one-third of its total time to investigation of various rotor configurations. Additionally, the laboratories concerned with vibration and flutter, and with structures, contribute much of their time to helicopter problems. END

"Speak up man! What is it you want?"



John Thorp, designer of the augmented exhaust cooling system that "makes horses out of ponies", examines the installation in a 225 hp. Navion.

Jet Cooled Power Plant

A 225 hp "jet cooled" power package is being licensed for *Navions*. The new installation uses an exhaust augmenter to pull heat away from the engine and enable more power to be drawn from the power plant.

Originally designed for the Fletcher FD-25 "tank buster," this Continental engine cooling arrangement proved so successful that Fletcher Aviation Corp. of Pasadena, Calif., made a similar unit for their executive *Navion*.

Designer John Thorp reports a conservative gain of 15 mph in top speed with no cooling problems encountered in full throttle, low speed climbs.

"There is a 400 mph wind going through the engine with full power at maximum speed," says Thorp. "The six-inch stainless steel augmenter tubes installed on the end of the exhaust system cause a pressure drop forward of the firewall that is greater than that caused by ram-air alone.

"We can run this new 'jet cooled' engine full throttle on the ground indefinitely without overheating."

Cool air is drawn into the new engine from the top of the cowling, kept away from the hot exhaust system, and sucked out the augmenter tubes by the force of the exhaust gases. This system is similar to that used on the Convair 240 and the *Twin-Bonanza*.

The E-225-8 Continental is similar in size to the original E-185 power plant. The added horsepower is obtained by improving timing of the cam shaft and efficient cooling. The jet cooled system will be available for 185 and 205 hp *Navions* also. This installation that "makes horses out of ponies" will be available as soon as CAA licensing is completed. END

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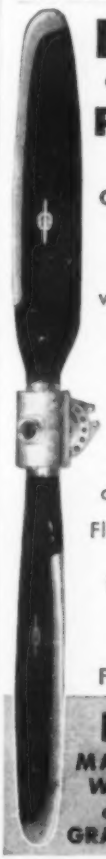

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1 2 3 4 5

(1) Northrop F-89 Scorpion; (2) Convair T-29; (3) Cessna L-19; (4) Chance Vought F7U Cutlass (above), Douglas XF4D Skyray (below); (5) Grumman F9F Panther (above), Grumman AF-2W Guardian (below).

Cat Shots in the Dark

(*Continued from page* 21)

greatly since the beginning, but tremendous effort has been expended in modifications of equipment and improvements in technique, especially during and since World War II.

By 1940, land-based night fighters had been successfully employed by the British against the Luftwaffe. Then, in 1942, our Navy formed "Project Affirm" at Quonset Point Naval Air Station, Rhode Island, to develop operational carrier-based night fighters. Experiments were undertaken to improve all phases of night work, including exterior and interior aircraft lighting, instruments, and approach and landing techniques.

While Project Affirm conducted its experiments at Quonset, harder lessons were being learned in the Pacific. In November 1943, Japanese torpedo planes attacked at night and severely damaged the carrier *USS Independence* in the Gilbert Islands area. Convenient land bases available to the Japanese made it comparatively easy for them to mount numerous night offensives. Their snoopers and hecklers grew increasingly bold. Nocturnal harrassment of our ships became a serious problem. Something had to be done.

Hero's Experiment

The late Edward "Butch" O'Hare came up with the answer to the night attack, and it was in so doing he lost his life. Commander O'Hare suggested to his task group commander, Rear Admiral A. W. Radford, that two fighters accompany a radar-equipped TBF on a night intercept mission from *USS Enterprise*. Combat Intelligence Control would direct the radar plane until it made contact with the enemy. The TBF would then take over to put the fighter on target.

In those days there were no Plan Position Indicators in CIC to show the air controller an aircraft's location. Radar, ranges and bearings were called out to a plotter, who marked them off on a chart with dividers and parallel rulers. This meant that instead of knowing instantly where the planes were, the controller knew only where they had been a few moments before. The time lag depended on the speed with which the plotting was done. In spite of this great handicap, the Admiral agreed that the plan was worth a try.

One mission was flown without incident, and the planes were recovered after daybreak. The next night, however, two groups of Japanese aircraft were detected approaching the task group. Two F6F's, flown by Comdr. O'Hare and Ensign Skon, were launched to fly wing on a TBF piloted by Lt. Comdr. Phillips, commanding *Enterprise's* torpedo squadron. A perfect interception resulted in the shooting down of two Jap *Betty's*, the disintegration of the leading attacking group, and the turning back of the remainder of the raid.

O'Hare, already a holder of the Congressional Medal of Honor, was shot down in the melee. Phillips and Skon, having expended most of their gas in combat, were taken aboard *Enterprise* before dawn, thus completing the first night combat carrier mission to begin and end in darkness.

Hunter-Killer Team

Radar was later made an integral part of the night fighter plane's equipment, making the use of an additional radar plane unnecessary, but the two-plane hunter-killer team, as it came to be called, became the basis of another branch of aerial combat, airborne anti-submarine warfare. Today, "Guppy" aircraft sweep the ocean's surface with powerful search radar, while beside them fly the explosives-laden "killer" planes, eager to be shown the way to their snorkelling target.

It took work, and lots of it, to make those operations routine. While O'Hare and his group were heroically improvising, the efforts of Project Affirm were bearing fruit. Affirm made good use of the experience gained by pioneer night fighter squadrons such as VF (N) 75, and its offspring, VF(N) 101 fighting from shore bases in the Solomons in 1943. VF(N) 101, originally a detachment of VF(N) 75, went into action from the *Enterprise* on New Year's Day, 1944.

Lessons learned in combat, combined with research compiled by the pilots and scientists of Project Affirm, resulted in the formation of Carrier Air Group 41. CAG 41, the first night carrier air group organized as such, was commanded by Comdr. Turner F. Caldwell, who was later to fly the Douglas Navy *Skystreak* to a world's speed record at Muroc Lake.

Proving Value

Although formation of a night carrier air group was a great step forward in the progress of air power afloat, not all in the Navy were convinced that night operations from carriers were a practical necessity.

Pilot Aid

by Bob Blatt

DOOR CONTROL ROD

A CARBURETOR control rod and ball joint bracket from a Ford Tractor makes an excellent holder for a *Seabee* left door. It permits the pilot to have the use of both his hands for handling the airplane while he gets a view of the ground by the right wheel while taxiing. This is especially useful for backing up and the holder is sufficiently strong to hold the door against the reversed propeller slip stream. When not in use the rod hangs vertically inside the door, supported from the top. It is easily and quickly swung out and snapped into position in the ball joint bracket on the door whenever needed. C. A. Guenther devised and built this handy gadget.

A demonstration that night work for carrier pilots was a real necessity occurred in June 1944. During the (First) Battle of the Philippine Sea, an extended mission forced so many of our pilots to return to their ships after dark that there were actual instances when two planes made night landings on the same carrier at the same time. Had all hands been checked out in night shipboard landings, there would have been considerably less confusion and fewer losses.

The practicability of night carrier operations was adequately proved by CAG 41. Planes had been shot down at night by squadrons that had been in action before this first night air group, but 41's record was phenomenal. On its first cruise, the bag was 46 enemy planes, 30 of them at night. It destroyed 20 more on the ground, and sank three ships, one of them at night. The results obtained by this group of specialists had to be convincing even to the skeptics.

Thus night carrier landing training became a requirement for all carrier pilots by August 1945.

* * *

Lots of different ways of getting aboard at night have been tried since Admiral Price did it for the first time. There was, for example, the "controlled method" of approach, used by some carriers in 1944. An Assistant Landing Signal Officer took station in Sky One, high on the island. Combat Intelligence Control vectored the plane in until he reached the starboard beam of the ship.

From there, the ALSO used the radio to help the pilot set up his pattern for a normal 180° turn upwind, then a downwind leg on a course the reverse of the carrier's. With the plane abeam on the downwind leg, the ship would turn on her deck lights, signal bar lights, and guide lights. At this point the pilot would start his 180° left approach turn. Next, the LSO in his customary position at the after port corner of the flight deck would signal the pilot when to start the final 90° of the approach turn. He did this simply by turning on his wand and suit lights. The pilot picked up the LSO visually then and followed his indications to a landing.

Pilot Sets Pattern

Today, the controlled approach has generally been abandoned, for visual approaches, in favor of one in which the pilot sets up his own pattern all the way. He still picks up the LSO in the final 90° of his approach, but here again there have been developments.

Greatest improvement has been the replacement of electrically lighted wands for the Landing Signal Officer by a system of fluorescent suit and paddle illumination.

Experiments in the latter part of 1944 firmly established the worth of the fluorescent system still in use. The LSO wears a suit with strips of fluorescent cloth attached vertically down the front from chest to ankle, and across the suit at chest level to extend along the arms to the wrists. Paddles are fitted with similar fluorescent material. Mounted on the deck before the Signal Officer, and trained on him, is a group of ultra-violet lights. In the dark, with the rays from those lights striking the cloth, the LSO resembles a glowing, animated skeleton man.

He's more than a skeleton to you, though, up there in your plane sweating out this night landing. By meticulous navigation (and not a little help from radar) you have found your ship once more. They give you the signal to prepare to land, and you drop your tailhook. You let down smoothly, timing your orbit so you arrive on the landing course, at landing circle altitude, as the ship is turning into the wind. You get the landing signal now, make your breakoff upwind, and start setting up your plane for the carrier approach. You kill your airspeed and drop wheels and flaps.

Out of your turn, you check gyro heading and begin looking for the ship's lights again. With the lights just forward of your beam, you put your prop in low pitch and start your turn from the 180° position. You have purposely lost altitude coming downwind, so you check your radio altimeter (something Admiral Price didn't have) approaching the 90° spot. It registers considerably less than 100 feet.

At the 90° position, you're in a three-point altitude a few knots above stalling speed with plenty of power on. Where's that LSO?

He materializes suddenly at the near corner of the softly shining rectangle of light outlining the flight deck. He'll have time to give you about three signals, no more. Signals are harder to read at night, and can't be seen as far.

The LSO's right arm is down at a 45° angle, his left out horizontally. "You are fast," he is telling you. You ease off throttle, raise the nose slightly to maintain altitude with less power on. The right arm comes up now in line with the left, making the Roger signal, meaning your approach is just right. Keep it that way. Fly on around into the groove, levelling wings to line up with the deck.

The LSO's right arm snaps the paddle across his chest while the left arm drops to his side. The Cut! You chop the throttle, let the nose drop a bit, fly to a full-stall, three-point landing dead center. Your body surges forward against the shoulder straps as the arresting wire rudely seizes your tailhook and hauls you to an abrupt stop.

The bite of the straps makes you realize that you've done it again. You and your airplane have beaten once more the forces of darkness.

Admiral (then Lieutenant) John H. Towers, in July 1911, made the first successful night landing in a naval aircraft. He landed a seaplane on the Severn River between two rows of gasoline flares set in rowboats to light up his pathway.

The fires lighted by Admiral Towers are still burning. END

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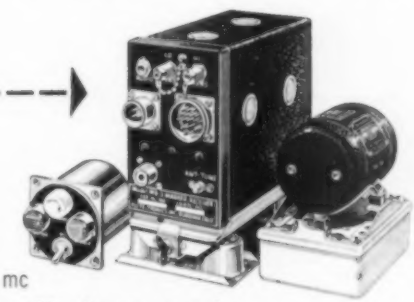

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FLYING FARMERS

By BILL RENSHAW

RED TAPE

"Red tape—Expensive bulletins"—That is the tone of many letters answering our inquiry as to why some FF's learn to fly, buy an airplane, use it almost every day; and then suddenly ground themselves by selling their plane and turning their strip back to soybeans or corn.

Mark Evans of Big Rock, Ill., voices the opinion of this group by saying, "lack of utility is a factor, but red tape and expensive mandatory bulletins are why most FF's quit flying." Instead of blaming CAA as many folks do, Evans concludes with, "It is up to aircraft makers to work out a better plan of backing up their product."

FLYING AND FEAR

Flying farmers believe that we have a good chance of eliminating fear as a reason for not flying, especially among rural folks.

In a survey that reached into every corner of the nation, this columnist asked FF's "what percentage of today's flying farmers' children will be afraid to fly when they reach maturity?"

The answers ranged from 1 to 20 per cent, with most of the FF's saying, "None of our children will have any fear of flying." Many added, "That goes for our neighbors' children too."

Typical reply came from Cecil A. Wright, Newport Center, Vt., who said, "If children of school age had a chance to fly, there would be few people in the next generation afraid to fly. I believe in starting them young."

Reginald Wood, New Milford, Pa., predicted that less than 5 per cent of today's flying farmers' children would feel any apprehension toward flying.

Safety factors will play a big role tomorrow, even among children reared with an airplane in their back yard, in the opinion of John Wiley of Prosser, Wash. "Fear of flying," Wiley says, "comes with maturity and responsibility, so the percentage who grow up to be afraid will depend on safety developments."

An earlier question in our survey asked "to what extent does fear keep a large percentage of people from flying?" Gilbert M. Chappell, Batavia, N. Y., gave us a tantalizing answer that started us on a question and answer survey among non-pilots.

Chappell expressed the belief that fear plays a much larger part than most of us realize, adding, "I think the only way to overcome the bugaboo of fear is with an informative type of educational campaign directed at the general public."

In our non-pilot survey, 211 adults of all ages and professions were contacted. An even 100 said, "You'll never get me up in one of those things," or words to that effect.

Asked "why are you afraid?" 29 said, in substance, "I'm not afraid. I just never lost anything up there."

"If the engine dies you're a goner," was the reply given by 47. When told that landing a light plane with a dead engine could usually be accomplished without injury to the pilot or damage to the plane, 23 of the 47 said they had always thought that a plane would fall like a rock if the engine quit, and nine of the 23 were still skeptical after a thorough explanation of how a dead stick landing could be made. Three of the nine said they had read newspaper stories about airplanes falling.

The reactions of the remaining 35 fall into the miscellaneous category, with several remarking that they would fly if it ever became necessary for them to get somewhere in a hurry.

Women generally expressed far less fear than did men. In fact, 11 women, all judged to be past 60, were contacted. All said they would not be afraid to fly.

One thing seems certain. It will take a thorough educational campaign to eliminate that pessimistic oft heard phrase, "Me, I want to keep one foot on the ground."

DOWNTOWN STRIPS

When midwestern FF's jumped at the chance to visit the Maitland Airstrip, Milwaukee, Wisc., they demonstrated again that they are tremendously interested in close-in landing strips.

Major cities desirous of obtaining additional agricultural trade would do well to consider the construction of so-called downtown landing strips. To attract maximum use, these strips should be free of landing fees. Tie down charges should also be as low as is consistent with good business.

FF RECOGNITION

Flying farmers have been until recently a novelty in the minds of many. That novelty is wearing off and with it is coming a recognition that farmers who fly airplanes are not dare-devil playboys, but hard-headed businessmen blazing new trails.

Industrial leaders are recognizing that farmers who own airplanes are large-scale customers for tractors, automobiles, and 1,000 and one other products that go to make rural living the best possible life.

As a result of this recognition, flying farmers are being swamped with invitations to visit industrial plants of all types. This will be all to the good if FF officers and state aeronautical officials are careful to screen out those of a purely selfish nature.

****

ANSWERS TO "WHERE AM I?"
(PAGES 54-55)

1. Elmira, N. Y.
2. Death Valley, Calif.
3. Seattle, Wash.
4. Allegheny ridges of Central Pennsylvania
5. Miami, Florida

****

Taylorcraft Tourist

(*Continued from page* 33)

Again Bennett pulled two notches of flaps, slowed to 65 mph indicated, but this time landed into the wind. Again she paid off in the stall at 40 mph. The short runway was used again and we were at a dead stop halfway down it. From hangar to hangar we had used some 35 minutes.

The *Tourist* is a four-place, closed, land monoplane. It is internally trussed with chrome-molybdenum steel tubing in the fuselage. Two stout spruce spars and a network of stamped aluminum ribs reinforce the wing. Lift is created from a Gottingen airfoil, series 398, basic. However it has been modified considerably by Taylorcraft engineers to incorporate better performance while retaining high lift. This is the secret of their stable slow-flight characteristic. This airfoil has been dubbed the "JCH" airfoil. Two wing tanks hold 40 gallons of fuel.

The ailerons and flaps are of ribbed aluminum alloy construction and occupy the total length of the wing. An extra-wide curved gap appears between these and the wing proper. It was stated that this produces better control at slower speeds. They appear to have insufficient area, but control seems to be good.

Treated Fabric

Taylorcraft has answered the big argument of fabric vs. aluminum in its own way. It uses grade "A" fabric over the airplane, but finishes with acetate butyrate flame-resistant dope. This provides fire protection but also gives ease of maintenance and repair. The prototype, N 36320, used a synthetic enamel vermilion colored with unusual cream striping and trim. However, production models are using acetate colors of lemon yellow for a bright base, with heavy trim of chevron blue.

The steel tubular fuselage holds a Continental C-145-2 engine in three-point suspension instead of the conventional four points. Standard accessories include starter and generator by Delco-Remy, Bendix magnetos, carburetor by Stromberg, and on the nose is hung a Sensenich 76 JR 54 wood propeller. Metal and variable pitch propellers are optional.

The landing gear is identical with earlier model T-crafts save that it has been beefed for additional loads. It uses shock-cords tied from landing gears to the belly of the fuselage (all concealed). This type of gear gives a minimum of drag, but has its own maintenance problems. Believe it or not full wheel pants are standard equipment.

They have retained the basic outlines of the tail-group of the BC12D model—contenting themselves with enlarging the area and doubling the trim tabs on the

elevators. This makes for better longitudinal stability.

Ample Leg Room

The cabin is roomy. It may be entered by two doors on the right, and one by the pilot's seat. It measures 42½" wide, 75" long (plus front leg room) and an average of 48" high. A baggage compartment aft of the rear seat has a legal capacity of 100 pounds. Its dimensions are 32" wide, 20" high, and 100" deep. The compartment lid is hinged and leaves a space above it (13" by 11" by 32") for hats, umbrellas and wifely objects.

The front seats are divided (the right seat comes out easily with provision for

TAYLORCRAFT *TOURIST*

Model 15A
ATC 3A3
(With Continental C-145-2—
145 hp. @ 2700 r.p.m.)

Span	36-0 ft.
Length	21-0 ft.
Height	7-1 ft.
Wing Area	186.3 sq. ft.
Useful Load	925 lbs.
Gross Weight	2200 lbs.
Maximum Speed	125 m.p.h.
Cruising Speed	115 m.p.h.
Take-off run	500 ft.
Climb, first minute	700 ft.
Ceiling, Service	16,000 ft.
Ceiling, Absolute	17,500 ft.
Range, Normal	500 miles.
Fuel Consumption	8.5 gal.
Landing Speed (with flaps)	36 m.p.h.
Fuel Capacity	40 gal.
Oil Capacity	9 qts.

Source: Taylorcraft, Inc., Conway, Pa.

cargo and/or litter patients), while the rear is a single unit for two people. The entire cabin material and color scheme was styled by Peter Muller-Munk Associates. They used a three-tone gray for ceiling, walls and seats, with ribbons of vermilion for contrast. Leatherette is used extensively in creating blending colors. Even the instrument panel and the individual seat harness are of a soft gray.

The panel is inlaid with a chrome plate. The top row from left to right consists of Hallicrafter radio, airspeed, compass, altimeter, the accessory box (houses fuses). Middle row includes amperemeter, oil temperature, tachometer oil pressure, fuel pressure (with switch for left and right tank readings), and black starter button located to the left of the tachometer. Bottom row of knobs are carburetor heat, master switch, gas shut-off (main) plastic Shakespeare Throttle, primer, mixture control, and cabin heat.

Safety Group Consulted

Two heavy cast aluminum "safety" wheels operate the control system (ailerons and elevators). They are heavy-duty and designed in accordance with the recommendations of the Cornell Safety group. A plastic "Taylorcraft" emblem is embedded in red leatherette. The trim tab is located top center above the front seats. The indicator is just to its left. On the floor between the seats is a three-position flap handle. A small crank to the left of this controls fore and aft movement of the pilot's chair.

Taylorcraft features the following items: (1) Safety. It has sacrificed speed in order to gain slow flight stability and consequent safety. The special airfoil was used with this in mind. It uses slots where possible, even between flap-ailerons and wing panels. As Al put it, "We've slotted everything." The Company has attempted to build stall-resistant wings. (2) Utility. Both the right and rear seats are removable for cargo, or for ambulance purposes. (3) Pilot and passenger comfort. Here they used foam rubber adjustable seats, full leg room, and big rear windows. (4) Cowling that hinges for easy maintenance and saves cuts on head while inspecting. (5) Toe brakes for easier ground control. (6) Flame-resistant dope finishes, and (7) Reputation.

Like many aviation manufacturers, Taylorcraft has had its economic ups and downs, but it has always built a reliable lightplane. This airplane is ATC'd under the Civil Air Regulations, Part 04, which means it will take up to six "G"s. It was licensed April 1, 1951, and has been given more than 500 hours of flight testing. It was built for Sunday pilots, not professionals. Ben Mauro put it this way, "We are staying low and slow—low in price as possible, and slow in sacrificing safety."

Holding Out for Harness

As to its defects, I am still hammering for shoulder harness. For a price of $6,790, I believe they should throw in a batch. They are now on the market for less than $5 per set. Secondly, I feel that a skylight of some sort might be more useful than the styled polar gray fabric. While visibility is good, it doesn't go far enough. The "step-in" cabin, only 26" from the ground, is a step in the right direction. One can still be a lady in a full skirt. Performance-wise, the *Tourist* does well. With a "metal" or "matic" prop it would do better.

Taylorcraft is also building an 85 hp known as the *Sportsman* and a revamped 65 hp known as the *Special DeLuxe*. It is also in the defense effort by way of (1) complete tail groups for Navy blimps, (2) stabilizers for Bell helicopters, (3) parts for Martin Aircraft. A diesel engine is optional (when ATC'd) for their models, and an exclusive has been obtained (under 2,500 lbs.) on the Custer Channel Wing, which may or may not be out of this world. After five years of systematic foundation building, Taylorcraft is out to set the world on fire—and it appears that they now have a few matches with which to do it.

END

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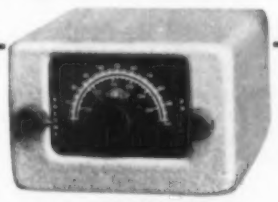

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Men and Timber

(*Continued from page* 34)

supplying Trail Creek were also serving a beleaguered crew on the St. Joe in Idaho, a new trouble-maker in the Selway, and hauling a steady flow of jumpers to isolated spot fires. Because of the speed of their attack on remote fires, smokejumpers save as much as 10 times the cost of ground fighting. Ground suppression of fires is costly even though methods are streamlined and a sincere, constant effort made to whittle down the cost.

37 Years Growing

Aerial control began in 1915 when a Curtiss 100 hp flying boat made daily fire patrols over Wisconsin's Big Trout lake area. The idea died and did not materialize again until 1919 when the first regular patrols originated in California. From bases established at Rockwell, March and Mather Fields, Fresno and Red Bluff, Army pilots flying Curtiss JN-4's and deHavilland 4's made regular runs. Supervisor Charlton of the Angeles forest made history using a plane to direct action on a 165,000-acre fire.

The idea picked up further momentum in 1920 when 20 rangers from western forests met at March Field for a month-long session in aerial observation, use of radio (code) and the training end use of carrier pigeons. A $50,000 Congressional appropriation supported regular coastal patrols. This good start petered out but was reinstated in 1923 with funds earmarked solely for "planned reconnaissance after particularly bad lightning storms."

In 1925, Howard Flint organized the first patrols for Region 1, comprising Montana, Idaho and eastern Washington. With pilots R. T. Freng and Nick Mamer, he undertook the first aerial mapping of a vast, unexplored mountain hinterland.

When word reached Flint's office that foodstuffs had been dropped free fall in a mountain meadow on the Trinity forest, he called Bob Johnson to join him in an "experiment." Bob had already logged hundreds of hours on fire patrol with an OX-5 *Swallow* with a 90 hp engine. Later he flew a *Travelair* cabin monoplane with a Wright Whirlwind J-6 type motor, a gasoline capacity of 130 gallons and cruising range of 1,100 miles—an unprecedented development for the time.

'Chute Drops Perfected

Dissatisfied with the results of free fall dropping, Johnson appeared at his hangar one morning with an armload of burlap bags. Ripping them into squares, he rigged a fair cargo chute. By the time the tall timber close to Missoula bloomed with hung-up chutes and dummy cargoes, Johnson had pretty well perfected his tree-top level, spot cargo dropping. The next year brought the thrill of a lifetime to exhausted ground firefighters as gas and oil for the pumps were dropped to them.

Still, Flint was not satisfied. He added aerial surveys of bug infestation areas in Yellowstone Park, then got more excited when Orange Olsen suggested using a plane for field counting the Nebo elk herd in central Utah.

The really big year in use of aircraft for Forest Service jobs, and the turning point in the acceptance of the idea by forestry officials, was 1931.

Bob Johnson and his brother, Dick, located two pinpoints far behind the timbered ridges where the Forest Service could hack out emergency landing strips. One was the Moose Creek strip in the Selway; the other touched the Big Prairie ranger station in the equally primitive South Fork of the Flathead river country. The "emergency" category was dropped that first season after Bob and Dick delivered 65 tons of freight and 300 firefighting personnel onto those fields.

From Michigan to Washington and down to California the plane was being used more frequently by Forest officers but only in Montana was it being given a full chance to show its stuff. Much of the credit was due Flint and the Johnsons.

Meanwhile, in Idaho, forester T. V. Pearson teamed up with a professional parachutist, Buddy Bruce, to experiment in the use of parachutes for placing men close to fires. The project was abandoned because of a high risk element and a general frowning at such damn-foolishness.

In October, 1935, Flint took leave to join the National Geographic Society expedition shooting the "River of No Return," the Salmon with its mile-deep canyon. The jaunt was reported daily through nation-wide newspaper coverage until a two-day silence gave rise to alarm for the explorers. Finally a message got through on a telephone line strung deep into the Selway that the expedition's radioman, Flint, was gravely ill of pneumonia and needed immediate hospitalization. Would one of the Johnsons pick up at Mackay Bar?

This 1,100-foot strip of driftwood-pocked gravel was the only spot in the 253-mile long, 2,355-foot descent of the gorge where such a rescue could be attempted. Dick Johnson pulled it off in a flight that made headline features for weeks, but Flint died two days later.

Live Jumps

By 1937, dropping hot meals to firefighters was instituted successfully, along with dropping hay and salt blocks to distressed big game. Not until October, 1939, did Forest Service officials return to the idea of parachuting firefighters. After 60 live jumps in the experimental project, with Frank and Chet Derry doing most of the earlier jumps and equipment development, the first squad went into action in 1940. On July 12, Rufus Robinson made the first jump to a fire on the Nez Perce forest, followed a few seconds later by Earl Cooley.

Three days later, a *Travelair* on a cargo dropping mission crashed in the Bitterroots. Pilot Bob Maracich was killed, Dropper Del Clabaugh injured. Chet Derry made the first U. S. aerial rescue jump to that crash and rendered first aid. The idea took hold and Dr. Leo P. Martin, a Missoula surgeon, trained to become the first paradoctor. The next year the U. S. Army Air Force, the Coast Guard and Canadian Air Force sent squads to train at smokejumper headquarters in spot jumping and air-search and rescue. Those men were to military and civilian planes what the Coast Guard is to ships at sea.

On March 1, 1945, Dick Johnson and Orange Olsen took off for the Tetons in Wyoming on another of the countless game-count flights begun 14 years earlier. A freak blizzard wiped their names off the trip boards for all time.

Expanding Service

The post-World War II years saw forests from Montana to New Mexico expand their air-borne activities. Montana still led the way thanks to far-sighted Bob Johnson. In 1947, he worked the knots out of the Forest Service's first large-scale insect control project, a spray job over 400,000 acres of tussock moth-infested fir in Northern Idaho and eastern Washington. Re-seeding of burned-over areas came next; then aerial patrol closed most of the ground lookout towers. When New England forests were blazing, Johnson and his pilots added long-range, cross-country aerial supply of firefighting equipment and personnel. Now regular runs are made to Oregon, California, New Mexico and Arizona.

Foresters wanted more men put out on fires in fewer trips, so Johnson added two C-47 Douglas cargo planes. His pilots were a little leery about taking the big babies onto the small back-country strips but before long were handling them like the Fords.

Still another problem was solved with the helicopter. The Forest Service went in for further rescue work, spraying and returning jumpers and gear from their isolated jump spots when Jack Hughes became Montana's first licensed 'copter pilot.

To the aviation-minded younger men working the Trail Creek fire, the sound of a plane engine throbbing over the smoke and flames and the sight of jumpers and supplies coming down to their immediate assistance were scarcely cause for comment. To the men who had watched a small, bright dream flicker and fade, then expand into a thrillingly effective tool and weapon, working for man and against the enemy fire, the sight and sound struck more than chords of memory.

To them, aerial control was the miracle of forest firefighting. END

"I distinctly said, 'Get me a *sextant*!' "

Hawaii

(*Continued from page* 36)

to California and back with the Deans in their new radio-equipped, four-passenger Cessna 170. The radio equipment gave navigation assistance, weather information, flight plan service, minimum safe altitudes along the route, helped us through busy traffic patterns at large fields and kept us posted on the whereabouts of our companions.

Each morning, the procedure was to get reports from the Weather Bureau, file a flight plan with the communications station, line-check the plane, and advise the tower on the number of occupants, color and license of plane, radio equipment aboard, destination, amount of gasoline aboard, estimated time of arrival, cruising speed, route to be flown, and the transmitting frequency.

Frequently, en route, we furnished communications stations with our position, type of flight plan and altitude. Our pilot did not fail to announce the completion of his flight plan at the end of the flight.

We left Middleton Airport on January 26, with the temperature at 10 below zero. After flying 500 miles in a little more than three hours, we were basking in sunshine at our first stop, Chillicothe, Iowa. That evening we were met at the airport in Lawton, Okla., by members of the Chamber of Commerce and were their guests that evening at the country club.

Next evening the caravan met at El Paso, Texas, and crossed the Rio Grande to Juarez, Mexico, for dinner and shopping. We did not reach Los Angeles next day, as we planned, for we were weathered in at Palm Springs. This hardly dampened our spirits.

Rendezvous in L. A.

The entire group met at International Airport, Los Angeles, at 10 p.m., January 30, for our flight to Honolulu. After pictures and a radio interview, we boarded the 52-passenger, four-engine Pan American *Strato Clipper* for a nine hour, 2,400 mile flight.

On entering the plane, one was reminded of a luxurious club, longer and wider than a Greyhound bus and with a lounge on the lower floor. It was interesting to learn that flying Clippers have travelled more than 700 million miles since 1927, with more than 10 million commercial passengers carried in comfort and safety.

Oahu, the "gathering place," is the threshold over which we entered Hawaii. It is the governmental, educational and financial center, and there guides escorted us to Diamond Head Crater, Nuuani Pali, and the U. S. Naval Base at Pearl Harbor. After reading that Wisconsin was shivering in 45 below zero weather, we thoroughly enjoyed the 75-80 climate.

Hawaiian Airlines flew us in a DC-3 to the Island of Hawaii, 216 miles away. On this, the largest of the islands, we saw the two great volcanoes, Mauna Loa and Mauna Kea, and visited the quaint villages along the quiet coasts of Kona and Puna.

The last few days, spent on Oahu, passed all too quickly. Loath to leave the incomparable beauty of the islands, we understood the familiar Hawaiian saying: "*Aole oe i noho a ike ia Hawaii.*" "You have not lived until you have seen Hawaii." END

Weather Wisdom

(*Continued from page* 14)

lighter. So damp air rises because it is lighter than dry, believe it or not.

If you find yourself standing in a bathtub of room-temperature water and want to play scientist—go ahead and turn on the cold water. You will feel it first at toe level as the denser coldness creeps downward. Now turn on the hot water and you'll feel the warm "front" make an opposite slant, miss your toes and first attack you at water level height. Now you can continue with your bath, you researcher you.

But back to the large and terrifying drawing—notice that the thunderhead is fed by drafts coming in from the sides. That's something new we've learned.

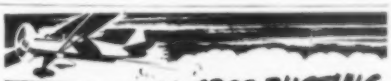
The downdrafts toward the rear of the "front" are not yet recognized by the chaps with the slide rules, but the fellows who have dropped a thousand or more feet while in a climbing attitude will testify that they exist.

I did several models of these fronts for the Navy and they were particular about emphasizing the rule of crossing the front at right angles where some blue sky can be seen, and then never changing your mind and turning back.

The cold front is a lively one but it is not wide; there is always fine clear air just on the other side. Navy also had me include the fact that flying beneath the front, if the terrain is flat, is better than flying through it. However, flying beneath this turbulent mass in mountainous terrain is not recommended.

Of course the commercial airlines and military planes have power to fly above most of the weather. They also have a vast amount of detailed forecast as well as range to fly around as concentrated an area as a thunderhead; but to the private flyer a cold front wall looks pretty high as well as formidable.

The summer sky is full of them. They are beautiful but bouncy, and the more you learn about them the better off you are. The cold front is the broom of the skies; it sweeps away the warm sultry air with its bad visibility and fog. It leaves behind a fine crisp sky with few very high cumulus, an invitation to fly and a promise of at least another day of perfect weather. END



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MORE MIGHTY THAN MITE

Mooney Aircraft of Wichita, Kans., has announced its entry into the four-place personal-executive field with its Series Twenty aircraft. The artist's conception shows the general configuration of this plane, on which many months of design and engineering have already been spent.

First production models will be delivered by late fall, 1952. The company looks for a cruising speed in excess of 160 m.p.h., and a ceiling of 21,000 feet with four people and adequate baggage aboard.

Operation Caterpillar

(Continued from page 29)

Buzicky warned that even a concentrated spraying job could only stave off the caterpillar inroads in a relatively small area. All told, army worm hordes are expected to infest about 11 MILLION ACRES of Minnesota forest this summer.

The 1952 spraying job will be a private undertaking, with no State funds available for the operation. The serious nature of the worm nuisance has induced property owners to take concerted action for themselves.

"How much are they willing to pay?" you ask. The answer comes from Ray G. Glumack of Northeast Airways, Inc., Virginia, Minn., who is heading the leaf-saving project. "We believe we have this plan worked out so that the cost of spraying for an average resort of 20 acres will be in the neighborhood of $65 to $70."

Glumack and Buzicky agree that if the spraying is done at just the right time, they can guarantee that there will be "islands of green" in a "sea" of brown desolation when the worms have done their worst.

The Minnesota operators expect to round up 75 spray-equipped planes to deal with the pest. The spray poison application must be accomplished while the worms are small, which means in a period of about three weeks.

Operating the spray planes at a low altitude over forest areas takes a bit of "doing," according to Glumack, especially since many of the operators will come from farm and prairie areas where spraying hazards are reduced by flat terrain. "We will have a couple of good briefing sessions to remind the boys about those lone, towering tamaracks which just seem to reach out for your wings without warning," says Glumack.

Planes used in the densest forest areas will be equipped with floats and will be operated and serviced from lake surfaces, while operators flying planes with wheel landing gear will be assigned spraying areas nearer highways and airports.

The resort owners are optimistic as the "aerial mercenaries" gird for battle. The noise of buzzing planes, spraying back and forth over the resort areas, will be welcome music to their ears.

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